

THE AMERICAN JOURNAL OF PHARMACY.

APRIL, 1882.

ON HOMATROPINE.

BY PROF. FREDERICK B. POWER, PH.D.

Read at the Pharmaceutical Meeting, March 21, 1882.

Among the many interesting problems of organic chemistry which have received the attention of chemists, that bearing upon the constitution and relations of the alkaloids of the Solanaceæ is one of the more important in its character, not alone from the results at present accomplished, but also with regard to its ultimately more extended application; and it is chiefly to the classical investigations of Ladenburg that we owe the many valuable contributions in this special department of chemical research.

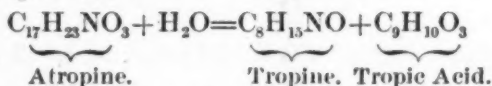
Although the results of the progressive investigations of Ladenburg have from time to time been made known to the readers of the JOURNAL through the "Chemical Notes" of Prof. Sadtler (this journal, 1880, pp. 148, 198, 367, 550), it has seemed desirable that a somewhat more extended notice should be given of that derivative of atropine which has received the appellation of homatropine, and which, in the form of hydrobromate, has recently been brought more prominently to professional notice through its valuable application in ophthalmic practice.

It may thus be primarily stated that it is not the purport of this notice to record any hitherto unknown facts, but rather to briefly summarize the more important points of interest relating to the body known as homatropine and to render the substance of the literature connected therewith, which is principally distributed through the German scientific periodicals, accessible to the readers of the home journal.

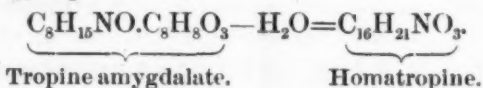
As is well known, the first contribution to the constitution of atropine was furnished by Kraut and Lossen,¹ who, by the action of either

¹ "Annal. Chem. Pharm.," Bd. 138.

barium hydrate or hydrochloric acid, succeeded in decomposing it into tropine and tropic acid.



The most important step in the direction of the synthesis or artificial formation of atropine was the subsequent success of Ladenburg¹ in combining these two products of decomposition, or forming tropate of tropine, and by heating with dilute hydrochloric acid at a temperature below 100°C., whereby a molecule of water is eliminated, accomplishing the inverse production of atropine. The success of this reaction led the same chemist to the expectation that other bases might be obtained in the same way, by the treatment of various tropine salts with dilute hydrochloric acid. This hope was fully realized, and in this manner an entire group of alkaloids may be formed, which, like atropine itself, are deducted from tropine, and to which the generic name of *tropeines* has been applied. The alkaloids hyoscyamine, daturine and duboisine, which Ladenburg has proved to be among themselves identical, and isomeric with atropine, are also with regard to the analogy of their products of decomposition tropeines. Of the new bases or tropeines, which may be formed by the above-mentioned reaction, the following have been prepared and more particularly described by Ladenburg:² *oxybenzoyltropine*, $C_{15}H_{19}NO_3$, *paraoxybenzoyltropine*, $C_{15}H_{19}NO_3$, *orthoxybenzoyltropine*, or *salicyltropine*, $C_{15}H_{19}NO_3$, *benzoyltropine*, $C_{15}H_{19}NO_2$, *atropyltropine*, or *anhydro-atropine*, $C_{17}H_{21}NO_2$, *phtalyltropine*, $C_{24}H_{32}N_2O_4$, *cinnamyltropine*, $C_{17}H_{21}NO_2$, and *oxytoluyltropine* or *homatropine*, $C_{16}H_{21}NO_3$. It is, however, to the description of the latter compound, or its hydrobromate, which alone has as yet found a practical application, and which seems destined to occupy a prominent place among the mydriatics of pharmacy, that attention will here be confined. The base is readily obtained by the treatment of amygdalate of tropine with hydrochloric acid, whereby the elements of water are eliminated from the molecule and homatropine, $C_{16}H_{21}NO_3$, is produced:



¹ "Ber. der Deutsch. Chem. Ges.," 1879, p. 941-944.

² *Ibid.*, 1880, p. 104-110 and p. 1081-1088.

Even after a few hours a considerable amount of the base is formed and when the action of the hydrochloric acid is continued for several days on the water-bath, a good yield of this interesting body (about 50 per cent. of the theoretical amount) is obtained. From the solution in hydrochloric acid potassium carbonate precipitates an oil which does not solidify, but which may be extracted by chloroform, and, after the removal of the latter by distillation, is again obtained in its original state. For its further purification it is dissolved in dilute hydrochloric acid, and subsequently precipitated as a gold double salt or as picrate. These two compounds may be recrystallized from hot water and thus obtained perfectly pure. From the pure gold compound the pure homatropine hydrochlorate may be obtained by means of hydrogen sulphide. From the picrate the base may be again separated by dissolving it in a large amount of hot water, so that it remains dissolved upon cooling, then adding an excess of potassium carbonate, and agitating with chloroform. This is again shaken with a solution of potassium carbonate in order to remove the last traces of the picrate, then dried over potassium carbonate, and distilled. The homatropine is thus always obtained in the form of an oil, and the attempts of Ladenburg to obtain it in a solid or crystalline form were not successful. More recently, however, Merck,¹ of Darmstadt, has succeeded in obtaining it in transparent, colorless prismatic crystals from its solution in absolute ether. The crystals, though not readily soluble in water, are nevertheless hygroscopic and very deliquescent; their melting point is between 95.5 and 98.5°C.

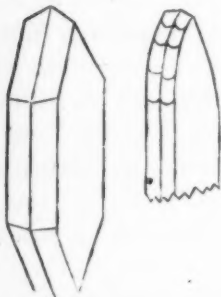
Homatropine-gold chloride, $C_{16}H_{21}NO_3 \cdot HCl \cdot AuCl_3$, is usually precipitated as an oil, but soon crystallizes, and may be recrystallized from hot water. It is thus obtained in handsome, sparingly soluble prisms.

Homatropine-picrate, $C_{16}H_{21}NO_3 \cdot C_6H_2(NO_2)_3OH$, is precipitated in an oily or resinous form, but soon becomes crystalline. It dissolves readily in hot water, and crystallizes therefrom in yellow, shining laminæ.

The sulphate and hydrochlorate are also crystallizable salts, and the acid solution of the latter shows the following behavior towards reagents: tannic acid gives no turbidity; potassio-mercuric iodide a white curdy precipitate; mercuric chloride a white oil, and solution of

¹ "Ber. d. Deutsch. Chem. Ges.," 1880, p. 1340.

iodine in potassium iodide yellow crystals together with a black oil. Platinic chloride produces in the concentrated solution an amorphous precipitate, and from the filtrate handsome needles are obtained on evaporation.



Crystal of Homatropine hydrobromate.

Homatropine-hydrobromate, $C_{16}H_{21}NO_3 \cdot HBr$, may be readily obtained in the crystalline form, and may therefore be directly prepared from the unpurified base. The crystalline mass thus obtained may be recrystallized from water, when the pure salt is obtained in large, wart-like aggregations of crystals.

The crystals have the form of rhombic prisms with irregularly developed pyramidal surfaces, as shown in the figure. The salt is not hygroscopic, is soluble in ten parts of water, and the solutions do not readily undergo change.

The physiological action of homatropine hydrobromate has already been briefly alluded to in this journal, 1880, p. 629, and 1881, p. 70. To recall the statement of Mr. John Tweedy and Dr. Sydney Ringer, as contained in the "Lancet," May 22, 1880, and abstracted in the "Amer. Jour. Med. Sciences," 1880, p. 267, it is a bland and efficient mydriatic, rapid in its action and of comparatively short duration. More recently the action of the salt has been made the subject of a large number of careful physiological experiments by Dr. S. D. Risley,¹ of this city, whose conclusions as to its value may be summarized in his own words:

"1. That homatropine hydrobromate in solutions of two, four and six grains to the ounce is competent to paralyze the accommodation.

"2. That in from sixteen to thirty hours this paralysis entirely disappears.

"3. That dilation of the pupil accompanies the paralysis and is more persistent, the probable duration being forty-eight hours.

"4. That it is no more liable to produce conjunctival irritation than atropine or duboisine.

"5. That it produces far less constitutional disturbance than either of the old mydriatics."

¹ "The value of homatropine hydrobromate in ophthalmic practice" in "Amer. Jour. Med. Sciences," 1881, p. 113—119.

OSMORRHIZA LONGISTYLIS, RAFINESQUE.

BY HOWARD L. GREEN, PH.G.

From an Inaugural Essay.

Synonyms—*Uraspermum Claytonii*, Nutt., Gen. I, p. 193; *Myrrhis folii trilobatis*, Gronovius Virg., p. 148.

Nat. ord., Umbelliferae; Sub-ord., Campylospermae.

A perennial herb indigenous to the rich, moist woods of the United States and Canada, growing as far south as Virginia, and West, as Oregon.

Stems erect, 2 to 3 feet high, of a purplish or green color, pubescent.

Leaves with long petioles, tripinnate, the divisions broadly ovate with the margins serrate or crenate, of a bright green color, slightly pubescent, especially along the midrib, the under surface shining.

Flowers white, in compound umbels of 2 to 5 rays, with an involucre of 1 to 3 narrow lanceolate leaflets.

Umbellets 3- to 5-rayed, involucels of 5 lanceolate cuspidate leaflets. Calyx teeth obsolete.

Petals oblong nearly entire, the points incurved.

Styles slender, nearly as long as the ovary.

Fruit linear, oblong, angular, solid and attenuated at the base, somewhat obtuse at the apex, upwardly bristly, intervals without vittae.

The underground portion consists of a rhizome 1 to 2 inches long, to which are attached a number of fusiform roots, from 3 to 12 inches in length and $\frac{1}{8}$ to $\frac{3}{8}$ inch in diameter, of a light brown color when fresh, but darkening on drying.

The roots and rhizoma possess a strong aromatic odor and taste, recalling those of anise.

It is from this it derives its name, *Osmorrhiza*, the word being derived from two Greek words signifying perfumed root.

The plant is commonly known as Sweet Cicely, Sweet Root, Paregoric Root, Sweet Anise.

It is among the first vegetation of spring, when it presents itself as a cluster of bright compound leaves, and develops flowers in June and July, the fruit maturing in August, after which the plant dies to the ground, and the bud for next year's growth forms and lies dormant until spring, when it again bursts forth with verdure and beauty.

The aromatic quality of the roots and rhizoma is due to the presence of a volatile oil of light brown-yellow color; the odor and taste recall those of anise, but are distinct. The oil is heavier than water, solidifies at 38°F. to a crystalline mass resembling oil of anise, with which it may be chemically identical. The yield from the fresh root is about $\frac{1}{10}$ per cent., but in the dry state the yield probably would be much larger, as the fresh root contains 68½ per cent. of moisture. A weighed portion of the root, after drying at a temperature of 220°F., and allowed to stand in the atmosphere for a week, and again weighed, was found to have absorbed 3 per cent.

A portion of the dried root, exhausted by percolation with ether, gives a bright yellow solution, which when evaporated leaves a dark brown oleo-resinous extract, which yields about half its bulk to 95 per cent. alcohol, leaving a dirty brown fatty mass, insoluble in hot alcohol, freely soluble in cold chloroform, and more so in carbon disulphide and hot chloroform. It partly saponifies on being boiled with caustic alkalies, and on the addition of an acid to the saponified solution an insoluble fatty acid separates.

The portion taken up by alcohol, evaporated in a silver dish on a water-bath, leaves a residue consisting of two liquids of different densities, the denser liquid being of a bright yellow and the other of a dark brown color. On being shaken with water the denser liquid mixes, but does not dissolve. This aqueous mixture is not materially changed on being shaken with chloroform. On boiling the mixture it becomes clear, but on cooling the matter again deposits; on the addition of a caustic alkali the separated matter darkens in color; on the addition of an acid the color is again restored. On evaporating a portion of this mixture to dryness, in a platinum dish on a water-bath, a yellow mass, having the general characters of a resin, is left.

The darker liquid, which has a nauseous, bitter taste, is completely taken up by chloroform and carbon disulphide. It appears to be a mixture of fixed oil, a fatty substance and the essential oil of the root.

After extraction with ether, the residue exhausted with 95 per cent. alcohol gives a light yellow solution, which when evaporated to dryness, in a silver dish on a water-bath, yields a nut-brown extract, almost wholly soluble in water, the solution being somewhat cloudy, due, perhaps, to the presence of a small quantity of resinous matter.

A portion of this extract, boiled with dilute sulphuric acid, then neutralized with calcium carbonate and the calcium sulphate formed

filtered off, darkens when boiled with a caustic alkali (Moore's test), reduces bismuth subnitrate when boiled with an alkali (Boettger's test), reduces copper oxide to suboxide (Trommer's test), and also reduces silver and mercury when boiled with a caustic alkali.

This is due to the presence of a saccharoid body, which is converted into glucose or similar sugar on boiling with sulphuric acid; probably a glucoside. An aqueous solution of this extract, decolorized by animal charcoal and evaporated in a silver dish, yields a syrupy mass having the odor and taste of molasses. A portion of the extract dissolved in water and placed under the influence of yeast for about 24 hours produced evolution of gas and the odor of a fermenting liquid.

About one-tenth of this liquid having been distilled off gave a pleasant smelling distillate in which the presence of a small quantity of alcohol was shown, thus proving the saccharoid nature of the original substance. The tests used were: potassium bichromate with sulphuric acid gave a green color; heated with a strongly alkaline solution of iodine there was developed the odor of iodoform.

After percolation with alcohol, the residue exhausted with cold water gave a light colored liquid which slightly coagulates on boiling. The albumen was separated by filtration and the filtrate precipitated by subacetate of lead, the precipitate collected and freed from lead by hydrogen sulphide, the lead sulphide removed and the filtrate boiled to free it from any remaining hydrogen sulphide. The solution concentrated produces a white precipitate with a solution of gelatin and a black precipitate with ferric chloride, thus showing the presence of tannin. After decolorization by animal charcoal only saline matter remained on evaporation to dryness.

The filtrate freed from lead by hydrogen sulphide, and freed from any remaining hydrogen sulphide by boiling, after concentration produced a precipitate of copper suboxide, when boiled with an alkaline solution of the oxide, and reduced silver in the presence of an alkali.

The residue, after percolation with cold water, was treated with boiling water and macerated for 24 hours and this infusion treated in a similar manner as the cold percolate. It contained starch and was precipitated by gelatin, but not darkened on the addition of ferric chloride.

The filtrate freed from lead and concentrated failed to reduce copper or silver or produce a change with caustic alkali, and on evaporation left a dark brown extract.

The residue, percolated with 10 per cent. ammonia, gave a brown solution which was decolorized by animal charcoal.

Percolation with dilute sulphuric acid now gave a light colored solution which was decolorized by animal charcoal.

One hundred grains of the root (air dry?) burned in a platinum crucible gave an ash weighing 6.5 grs., of which 3.75 grs. was soluble in water. The ash was found to contain carbonates, sulphates, chlorides and phosphates of potassium, calcium and magnesium.

Under a microscope magnifying 40 diameters, the mericarps are seen to be deeply grooved along the commissures, giving a cross-section the appearance of a horse-shoe. Beneath the epidermis are the five characteristic ribs which are composed of wood bundles. The embryo is of the same shape as the mericarp, white, and appears to be composed of a number of almost square cells arranged in layers parallel to the groove.

The rhizome shows three or four wood rings of a yellow color, traversed by numerous broad medullary rays; the pith is regularly divided transversely by air cavities. The root consists of a number of delicate wedges, arranged somewhat pentagonally around a large pith and traversed by broad medullary rays; the whole structure is of a yellowish-white color, the wood being slightly darker. The rhizome and roots are covered by a yellowish epidermis through which are scattered numerous cells containing a yellow, resinous or coloring matter.

This plant has never been recognized by medical authorities, but is to some extent used throughout the country as a mild carminative and expectorant in the form of infusion and fluid extract.

THE PTOMAINES AND THEIR SIGNIFICANCE IN JUDICIAL AND TOXICOLOGICAL CHEMISTRY.

BY PROF. TH. HUSEMANN.

Translated from "*Archiv der Pharm.*," xvi, December, 1881, pp. 415-424, by Fred. B. Power.

When the formation of ptomaines is particularly frequent in corpses which have been subjected to a slow process of decomposition, it is to be presumed that the same will be not unfrequently observed in the cadavers of persons which have been destroyed by acute arsenical poisoning. To such a probability Selmi had already pointed; but it was only some years later that he succeeded in furnishing the proof

that peculiar bases are here in question, which contain arsenic, and which deviate in their properties from the hitherto known arsines. It will not appear strange that these cadaver bases containing arsenic possess a strongly poisonous action, as is indeed the case with the various artificially prepared arsines.

Selmi¹ had already in 1878 reported two cases in which strongly poisonous and crystalline ptomaines were found by him in exhumed bodies containing arsenic. In the first case the subject was that of a corpse exhumed fourteen days after burial, which appeared well preserved, and in which a large amount of arsenic was detected. By the search for alkaloids with ether in the liquid made alkaline with baryta, a small quantity of a substance having an alkaline reaction and a sharp and bitter taste was found; it crystallized readily in needles, gave with acids crystallizable salts, and precipitates with the principal alkaloidal reagents, but not with platinic chloride, with which a precipitate was only obtained in very concentrated solution. With sulphuric acid this ptomaine gave a reddish coloration; with iodic acid, and afterward with sulphuric acid, free iodine was liberated and a violet coloration produced, which completely disappeared by neutralization with sodium bicarbonate; nitric acid colored it beautifully yellow, and by saturation with caustic potassa this color appeared still more perceptible; sulphuric acid containing nitric acid produced only after some time a reddish coloration; iodine in hydriodic acid gave no crystalline product. The amount of material did not suffice for a more complete chemical and physiological examination.

A short time afterwards Selmi succeeded in obtaining larger amounts of a more readily crystallizable ptomaine from a body containing arsenic, which had been exhumed one month after death. For obtaining the same the liquid obtained by extracting with aqueous alcohol was concentrated at from 35 to 45°C. to 70 cubic centimeters, then made alkaline with baryta, and shaken with ether. After the separation of the ether by distillation and spontaneous evaporation, there remained 5 cubic centimeters of a turbid and somewhat colored aqueous liquid, having an alkaline reaction and a sharp, somewhat bitter taste. After the addition of a little water containing acetic acid, with which the retort used in distilling was washed, filtration, and evaporation to dryness at a moderate temperature, the residue was taken up with

¹ Atti della R. Accad. dei Lincei, Ser. 3, vol. 2, 1878.

water, whereby a little coloring matter remained undissolved, the solution made alkaline with a little baryta, and the extraction with ether repeated. By the treatment of the alkaloid, which was thus obtained nearly colorless, with water containing acetic acid, evaporating to dryness, and again dissolving, a colorless solution was finally obtained which showed the following behavior toward alkaloidal reagents:

Tannic acid, a white, permanent precipitate.

Iodine in hydriodic acid, a kermes-brown precipitate, gradually disappearing, and furnishing microscopical colorless and branched, but no yellow or brown crystals.

Platinic chloride, no precipitate, but in the course of time yellow crystals appeared, which were different from those of platinic chloride.

Auric chloride, a yellow precipitate was directly produced, and in a short time reduction to metallic gold.

Mercuric chloride, a white precipitate.

Potassium bichromate, no precipitate.

Picric acid produced directly a yellow precipitate, which in time changed to long, crystalline tables of a yellow color.

The evaporated residue of the solution in question dissolved in cold concentrated sulphuric acid without coloration, although on warming a slight red color was produced, which did not change to brown. Sulphuric acid and potassium bichromate gave no color reaction. With Fröhde's reagent the solution remained likewise uncolored; a light yellow color which appeared after standing for an hour disappeared quickly, as also the insignificant brown coloration on warming. With iodic acid no iodine was liberated, even after the addition of several drops of sulphuric acid; but, on warming, free iodine appeared quickly, and on saturating with sodium bicarbonate the violet coloration disappeared. Sulphuric acid containing nitric acid produced a permanent, beautiful lemon-yellow coloration. Nitric acid produced, likewise, such a coloration, which, on saturating with caustic potassa, changed to orange; on warming the yellow color remained, and by the evaporation of the solution over a moderate alcohol flame a material of the same color was obtained, which, on the approach of a glass rod moistened with ammonia, passed into an intense orange color.

In order to ascertain whether arsenic was contained in the ptomaine, the strongly poisonous property of which Prof. Vella had demonstrated by an experiment on a frog, Selmi sought to destroy the same

with nitric acid, but this did not succeed, as an ochre-yellow residue remained, which also resisted the action of aqua regia. A better result was obtained by treatment with sulphuric acid and saltpetre. The dry substance dissolved in hydrochloric acid gave neither a yellow coloration nor a precipitate with hydrogen sulphide, even after 18 hours, which, as several milligrams were employed for oxidation, would demonstrate the absence of arsenic. As the difficulty of destruction of this base showed an analogy to those substances containing phosphoric acid, the residue obtained by the evaporation of the hydrochloric acid solution was dissolved in nitric acid, and the molybdic acid reagent added; but neither a yellow coloration nor precipitation ensued, so that the presence of phosphorus cannot come in question.

While in these ptomaines the presence of arsenic could not be definitely proven, Selmi succeeded later in discovering organic bases containing arsenic in the stomach of a hog, which had been preserved in a solution of arsenious acid in a closed vessel in a cool room. On opening the vessel no corrupt odor was perceptible, and also no inclination to the destruction of the tissue. The liquid, which had a slightly alkaline reaction, yielded on distillation in a current of hydrogen a clear alkaline distillate, in which isolated white and fatty flakes were found floating. After careful saturation of the filtrate with hydrochloric acid and evaporation in a bath of salt water, a white, non-deliquescent hydrochlorate remained in cross-shaped crystals, which on exposure to the air remained dry, and when moistened with a drop of solution of caustic soda developed a peculiar odor, which resembled to a certain extent that of trimethylamine, although the base could be neither confused with the latter, with other methylamines, nor with propylamine. The hydrochlorate of this volatile base was definitely recognized as containing arsenic, as Selmi found by destroying it, then oxidizing with nitric acid, taking up the residue with sulphuric acid, reducing the arsenic acid by means of sulphurous acid to arsenious acid, and finally testing in Marsh's apparatus. This body gave with *tannic acid* no precipitate; with *iodine* in *hydriodic acid* a precipitate of beautiful crystals of a gray color and the appearance of iodine; with *picric acid* a yellow precipitate, which changed to long, yellow felt-like needles. *Auric sulphate* gave no precipitate, but a very small amount of a powder consisting of very small and transparent microscopic crystals was deposited. Also *potassio-bismuthic iodide* and *phospho-wolframate of sodium* gave at first no precipitate,

but afterwards the former deposited a few yellow flakes and the latter a white precipitate. *Platinic chloride* gave directly a granular, canary-yellow precipitate of microscopic octahedrons. *Auric chloride* gave only in very concentrated solution an insignificant precipitate, which under the microscope consisted of fine, yellow rhombic tables. *Mercuric chloride* produced even in highly concentrated solutions no turbidity. According to experiments made by Prof. Ciaccio with 24 milligrams of the substance, this base is most intensely poisonous and resembles strychnine in its action.

In order to ascertain whether, besides this volatile base, a fixed alkaloid was still contained in the liquid remaining on distillation and in the solid matter, the latter was comminuted, the residue from the retort poured upon it, acidulated with tartaric acid and four times its volume of alcohol added; after digesting till the following day, the alcoholic liquid was separated from the solid matter, the latter again extracted with alcohol, the alcoholic liquids filtered, combined and distilled in vacuo until the alcohol was entirely expelled. The brown residue was made alkaline with barium hydrate and shaken three times with ether. By the distillation of the brown liquid obtained by the first treatment with ether, which possessed an alkaline reaction, a distillate having a peculiar odor was obtained which differed from that of the previously described volatile base. After spontaneous evaporation there remained a residue, which after some days acquired an unendurably disagreeable odor, although the base had been converted into hydrochlorate, which afterwards deliquesced. The small quantity prevented an exact examination.

The residue from the distillation of the ether was brown, glutinous, alkaline and nearly insoluble in water. After treatment with very dilute hydrochloric acid with the aid of heat and filtering off the separated fatty matter, as also after the purification of the yellowish-colored filtrate by treatment with baryta and agitation with ether, a distillation residue was obtained having an alkaline reaction and a somewhat cadaverous odor which, at first slightly colored, by exposure to the air became brown and at the same time insoluble in water. By the addition of a few drops of dilute hydrochloric acid, until the reaction was feebly acid, and moderately warming, a yellowish solution of somewhat disagreeable odor and bitter taste was obtained, which, when brought upon the tongue, produced a prurient sensation and afterwards loss of sensibility. This gave with *tannin* a slowly

separating, yellowish precipitate; with *hydriodic acid* containing *iodine* a yellowish-red precipitate and brown drops; with *platinic chloride* a yellowish powder, that even after several hours did not become crystalline; *auric chloride* gave a yellowish precipitate, and in a short time reduction ensued; *mercuric chloride* and *potassio-mercuric iodide* gave yellowish-white precipitates; *potassio-bismuthic iodide* an orange-yellow precipitate, changing to red; *picric acid* a non-crystalline, and potassium bichromate a reddish-yellow precipitate.

This alkaloid also contained arsenic and, according to the experiments made by Prof. Ciaccio on frogs, possessed a poisonous action which, however, was different from the strychnine-like action of the volatile arsine and was connected with the ordinary action of the poisonous ptomaines. Torpor, paralysis and systolic inactivity of the heart were the most prominent phenomena.

The communicated research of Selmi throws light upon one of the darkest portions of the history of toxicology, to the time of Toffa and other professional poison mixers, who understood rendering the activity of arsenious acid to a certain extent more potent. With the "Aqua toffana," the so-called "Acquetta di Perugia" played at the same time in Italy a not insignificant part. According to the tradition, this secret compound of the poison mixers of the 17th and 18th centuries was prepared by killing a hog, disjoining the same, strewing the pieces with white arsenic, which was afterwards rubbed in, and collecting the arsenical liquid which dropped therefrom. A liquid obtained in this way was said to have possessed a much more poisonous action than a simple solution of arsenious anhydride. There can be no doubt that by the longer preservation of pork or any other kind of meat, peculiar arsines were formed, and impart to the arsenical brine poisonous properties which surpass those of the arsenious acid, at least when applied in the solid form. It must also be considered that by this process compounds of arsenious acid with inorganic alkalies are also undoubtedly formed, which are more readily absorbed than the arsenious acid, and that the respective procedure had for its purpose to bring the largest possible amount of arsenious acid into solution. The same object was presumably in view by the preparation of the Aqua toffana with the addition of a plant juice, for which as is known that of *Linaria Cymbalaria* was added. Selmi and Vella presume that through the Acquetta di Perugia the concealment of the action of the arsenic on the one hand and of the tetanic poisons

on the other was accomplished. This supposition, which is based on an observation of Vella in a case of complex poisoning with arsenic and strychnine, does not agree perfectly with the experiments on warm-blooded animals by which, through the simultaneous application of arsenite of potassium and strychnine, the tetanic spasms were not prevented, provided that the strychnine was given in a toxic dose.

From still another point of view the ptomaines containing arsenic appear to be of significance in toxicology, from the fact that they help to explain an affection, that of chronic arsenical poisoning, as produced by arsenical wall-papers. As Selmi has shown that a volatile arsine is formed by the contact of arsenious acid and albuminous matters, which possesses a strongly toxic action and differing somewhat from that of arsenious acid, the author thinks it may be presumed that a similar product can be formed from the glue which is employed for affixing the arsenical wall-paper of a room, whereby perhaps the moisture of the air plays a part in the formation of the arsine.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B POWER, PH.D

Detection of Chloroform in Cases of Poisoning. By D. Vitali.—The author brings the liquid which has been distilled from the intestines into a three-necked flask, and conducts a current of hydrogen through the same. The hydrogen which escapes through a glass tube provided with a platinum point is then ignited. If chloroform is present in the liquid, it will be carried along with the hydrogen, and burn with the formation of hydrochloric acid. If a piece of fine copper wire be now held in the flame, the latter, in consequence of the formation of cupric chloride, will assume an intense green color. A small, scarcely visible drop of chloroform, when mixed with 30 cubic centimeters of water, will produce the green coloration very perceptibly.—*Chem. Zeitung*, 1882, No. 3, p. 47, from *Giorn. Farm. Chem.*, 30, p. 529.

Examination of Meal for Impurities.—The meal is gently warmed with 70 per cent. alcohol to which 5 per cent. of hydrochloric acid has been added. With pure wheat and rye meal the alcohol remains colorless, barley and oat meal color it pale yellow, corn meal and the bearded darnel (*Lolium temulentum*) orange, vetch and bean meal purplish-red, and ergot blood-red.—*Ibid.*, from *Biedermann's C.-Bl.*, ii, 69.

The Volatile Oil of Angelica. By M. Naudin.—From the fruit of *Angelica Archangelica* by distillation with water a volatile oil is obtained, which has the specific gravity 0.872 and an agreeable odor. By exposure to the light it soon becomes colored yellow, and by exposure to the air, through absorption of oxygen, becomes resinified. Under ordinary pressure it has no constant boiling point; it begins to boil at 174°C., although portions pass over even at 330°C. By distillation in vacuo 75 per cent. of distillate is obtained, which under a pressure of 22 millimeters, boils at precisely 87°C. This liquid has the formula $C_{10}H_{16}$, and is thus isomeric with turpentine oil, but is different, however, from all similarly composed hydrocarbons; it is colorless, has an odor reminding of hops, and an injurious effect upon the organs of respiration which is similar to that produced by fusel oil. Its boiling point is 175°C., the specific gravity 0.833, and coefficient of rotation $+25^{\circ} 16'$; the latter decreases constantly when the oil has been heated to 100°C., in a sealed glass tube, until it reaches a minimum of $+9^{\circ} 44'$. The liquid thereby becomes thick, and polymerized to a hydrocarbon, resembling the β -isoterebenthene, which is already contained in the crude angelica oil, and for which the author proposes the name of terebangelene. By the action of the halogens a violent reaction ensues with the formation of cymol.—*Ibid.*, No. 4, p. 68, from *Compt. Rend.*, 93, p. 1146.

The Detection of Small Amounts of Iodoform and Substances yielding Iodoform.—On heating an alkaline solution of resorcin with even very small amounts of iodoform a red coloration is produced, which again disappears on the addition of an acid. This reaction may be readily employed for the detection of small amounts of substances yielding iodoform, as alcohol, acetone, etc. As is known such substances are recognized by warming the liquid to be examined, adding a solution of iodine in potassium iodide or potassium carbonate, and then sufficient solution of sodium hydrate, drop by drop, until the brownish-yellow color is nearly discharged. On agitation and standing, the iodoform, separates as a bright yellow crystalline precipitate, which, under the microscope, appears in the form of regular six-sided tables or roundly-pointed laminae. As on the one hand small amounts of iodoform remain dissolved, particularly in alcoholic liquids, and on the other hand the microscopic examination of the precipitate is somewhat circumstantial, it is recommended to gently warm the liquid containing iodoform, obtained by the above method, with the further ad-

dition of alkali and a little resorcin. The above mentioned characteristic red coloration of the liquid then appears.—*Pharm. Centralhalle*, 1882, No. 2, p. 15, from *Ber. d. Oest. Ges.*, iii, p. 75.

Examination of Beer. By Prof. Dragendorff.—In the examination of beer for foreign bitter principles the following method has been found to yield good results. About 2 liters of the beer are heated on the water-bath until the carbonic acid gas and about half of the water have become expelled. To the liquid, while still hot, basic acetate of lead, containing as much oxide as possible, is added, and finally ordinary basic acetate of lead with the addition of ammonia water, until a precipitate is no longer produced; the precipitate, which should not be washed, is quickly filtered, in order to protect it from the carbonic acid of the air, and from the filtrate the excess of lead precipitated by the required amount of sulphuric acid. The quick deposition of the sulphate of lead may be accomplished by the addition of about 40 drops of an aqueous solution of gelatin (1:20) before adding the sulphuric acid. The liquid, after being again filtered, should no longer taste bitter, if the beer was unadulterated. For further examination ammonia water is added to the liquid until all the sulphuric acid and a portion of the acetic acid is neutralized (until methyl-violet is no longer rendered blue by a few drops of the liquid), and evaporated on the water-bath to from 250 to 300 cubic centimeters. The residue is mixed with 4 times its volume of absolute alcohol, in order to precipitate the dextrin, etc., the mixture well agitated, and, after standing for 24 hours in a cool place, filtered. After again removing the larger part of the alcohol by distillation the acid liquid is successively agitated with petroleum ether, benzol and chloroform, and this operation repeated with the same solvents in the stated order, after having previously rendered the liquid decidedly alkaline with ammonia water.

Pure beer, prepared from malt and hops, when treated according to this method shows the following behavior:

A. Absorbed from the acid solution.

1. *Petroleum ether* (boiling at from 33 to 60°C.) takes up but very little of the solid and liquid constituents of beer, among the latter the fusel oil which is contained in all beers. The solid portion of the evaporated residue obtained by agitation with the petroleum ether has scarcely a bitter taste, and is dissolved by concentrated sulphuric acid, sulphuric acid and sugar, as also by nitric acid with but a slight

yellowish color, while concentrated hydrochloric acid forms a nearly colorless solution.

2. *Benzol* (freshly rectified and boiling at from 80 to 81°C.) takes up only very small quantities of a resinous substance, which in its behavior toward the above-mentioned acids resembles that obtained from the petroleum ether solution, and which, when dissolved in dilute sulphuric acid (1:50) gives no precipitate with the ordinary alkaloidal reagents—iodine and bromine solution, potassio-mercuric and potassio-cadmie iodides; gold, platinum, ferric and mercuric chlorides; picric and tannic acids, and potassium bichromate—and does not reduce chloride of gold upon warming. Phosphomolybdic acid produces only after standing for some time a very slight turbidity. This substance also possesses but a feebly bitter taste.

3. *Chloroform* corresponds in its behavior to benzol.

*B. Absorbed from the ammoniacal solution.*¹

1. *Petroleum ether* takes up little or nothing.

2. *Benzol* removes but traces of a substance, which occasionally crystallizes from the ethereal solution, but which gives no characteristic color or physiological reactions similar to those of strychnine, atropine, hyoscyamine, etc.

If the beer has become sour before being examined, it will show a similar behavior upon agitation with these liquids, but from the properly prepared acid liquid a substance will be extracted (in small amount) by benzol and chloroform which, upon warming, reduces chloride of gold, and usually also nitrate of silver. Beer worts shows the same behavior as fermented beer.

In regard to the special reactions of the individual bitter principles, as also of the alkaloids which here come under consideration, and which may be isolated according to the above method and subsequently recognized, reference must be made to the original essay, or to Dragen-dorff's "*Gerichtlich-chemische Ermittlung von Giften*," where most of the detailed reactions have been previously published.

Glycerin is determined, according to V. Griessmayer, by evaporating 100 cc. of beer in a shallow capsule on the water-bath, as slowly as possible, and at a temperature of from 65 to 75°C. After the dissipation of the carbonic acid gas about 5 grams of magnesium hydrate are added, and the mixture repeatedly stirred with a glass rod so that

¹ Before rendering the liquid alkaline it should again be shaken with petroleum ether in order to remove the last portions of chloroform.

finally a homogenous, thick liquid mass is formed; but should not be evaporated to complete dryness. The capsule is then removed from the water-bath, about 50 cc. of absolute alcohol added, the mass triturated with a pestle, decanted into a large beaker, and the residue, which has been mixed with 20 cc. of absolute alcohol, filtered. To the mixed liquids 300 to 350 cc. of absolute ether are added, with active agitation by means of a glass rod, filtered from the flocculent deposit (para-peptone and maltose), the filter washed with a little ether-alcohol (3:1), and the filtrate finally allowed to evaporate spontaneously in a shallow capsule. The residue remaining from the treatment with alcohol is evaporated on the water-bath—with the above-mentioned precautions—to a syrupy consistence, and allowed to dry in rarefied air for 24 hours. The residue thus obtained is again dissolved in from 15 to 20 cc. of absolute alcohol, the solution filtered through a very small filter into a tared glass capsule, in which it is evaporated, and, after drying for 12 hours in rarefied air, it is weighed.

For light beers, which contain but little or no para-peptone, the operation may be simplified by not precipitating by ether the liquid first obtained by extraction with alcohol, but evaporating directly, and digesting the residue with ether-alcohol (1:1) instead of with alcohol, filtering, evaporating, and weighing.¹—*Zeitschrift für Analyt. Chemie*, 1882, p. 137; *Chem. Centralb.* [3. F.] 12, p. 285.

NOTE ON SYRUPUS FERRI PROTOCHLORIDI.

BY A. FRÜH.

The editorial remark in the last number (p. 129) that a syrup of ferrous chloride is made in France by simply dissolving protochloride of iron in simple syrup is suggesting the question why this preparation is hardly ever prescribed in France? The reason is that it is a very weak iron preparation, in which the iron as contained in the neutral salt is far from being readily assimilated by the blood. FeCl needing HCl to form an oxychloride by the action of oxygen in the blood-vessels. This oxychloride, which has necessarily to be the first alteration of the FeCl to undergo by the action of the oxygen, being

¹ This procedure is also adapted to the estimation of glycerin in wines (50 cc.), with the modification that the residue is digested with ether-alcohol (2:1); from highly colored red wines a slightly yellowish colored glycerin is thus obtained.

a very unstable combination, will readily be reduced by the action and heat of the blood to the combination of iron and oxygen which it is able to assimilate.

Syrupus ferri protochloridi is prepared by me on the same principle as the *tinctura nervina Bestuscheffi* or *tinct. ferri chlorati ætherea* of the German Pharmacopœia, which is a highly valued and much-prescribed iron preparation. In this tincture the ferric chloride is reduced to ferrous chloride in the rays of the sun by the ether forming chloride of ethyl, leaving the ferrous chloride as a colorless solution. In *syr. ferri protochl.* the sugar will, by the action of the iron, lose two atoms of hydrogen, giving them to the chloride of the Fe_2Cl_3 and reducing it to FeCl , forming HCl and saccharic acid, no grape sugar or glucose being formed by the reduction.

This is the case in the *syrupus ferri chlorati* of Hager's Pharmac. Manual, which is about five times the iron strength of my preparation and made by ebullition, which will form grape sugar and make the whole preparation changeable and unreliable.

The slight changes I have remarked in my preparation are the formation of very small quantities of oxychloride, causing the liquid to assume a yellowish tint and, in very high summer temperature, the assumption of the syrup of a slightly brownish color, caused probably by the absorption of oxide of nitrogen, which is a quality possessed by all the ferrous salts.

In making this syrup I was guided principally by the idea that this preparation, made on the same principle as *tinct. ferri chlorati ætherea*, might be just as valuable as an iron preparation and more useful, containing the iron in a palatable, active and easily absorptive state.

Greenville, March 14, 1882.

REMARKS ON SYRUP OF FERROUS CHLORIDE.—In making the brief editorial remark on page 129, our object was simply to direct attention to the only officially recognized formula for such a preparation; that quoted has been adopted by the Paris Pharmaceutical Society and, we presume, is used sufficiently there to warrant the official adoption of a formula. Many other formulas have, from time to time, been suggested, one of the latest being that proposed by Mr. Wm. Gilmour, in the "Chemist and Druggist," June, 1881, p. 251, which directs 288 grains of officinal hydrochloric acid, diluted with $1\frac{1}{2}$ oz. of water, to be saturated with iron, the hot solution to be fil-

tered and mixed with sufficient syrup to make 10 fluidounces. This, like the French syrup, contains no excess of hydrochloric acid, upon which our correspondent lays so much stress.

The formulas given by Hager order the preparation of this syrup from *ferrous chloride*, either dry or in solution, by mixing it *in the cold* with simple syrup; these preparations are intended to contain a minute quantity of free hydrochloric acid. We quote from Hager's "Manuale" and "Praxis" as follows:

SYRUPUS FERRI CHLORATI.

R	Ferri chlorati in solutione parati,	1·0
	Solve in syrupi sacchari	100·0
	Acidi hydrochlorici,	guttis 5
	Paretur ex tempore.	("Phar. Prax.")
R	Ferri chlorati,	p. 30
	Acidi hydrochlorici puri,	p. 3
	Syrupi sacchari,	p. 480
	Solve et misce.	("Manuale.")
R	Liquoris ferri chlorati (p. spec. 1·250—1·255),	p. 4
	Syrupi sacchari,	p. 20
	Misce.	("Manuale.")

The statement of our correspondent that, by the process suggested by him, no glucose is formed, will doubtless be modified on further examination. Since Raoult has shown, in 1871, that a solution of pure sugar in water, kept in vessels from which the air has been removed and exposed to the light, contains notable quantities of glucose, we have examined many samples of syrups made with refined cane sugar and found them to be free from glucose immediately after they had been prepared, but to respond to the tests for glucose after comparatively brief exposure to diffused daylight in the store. The formation of saccharic acid under the conditions stated by our correspondent requires proof, and the browning of ferrous solutions will be found to take place in an atmosphere containing oxygen and totally devoid of nitrogen oxides.

The Preparations of *Digitalis* have been examined for their effectiveness by A. Fraenkel by making subcutaneous injections to medium-sized dogs which had been brought under the influence of curare. The lessening of the pulse, with an increased volume of the beats, was regarded as the beginning of the effects. The tincture was found to be the least reliable, and the vinegar the most active preparation; but the doses of the vinegar, as well as of the infusion, necessary for the production of these effects were found to be variable.—*Archiv d. Phar.*, Dec., 1881, p. 451, from *Arch. Klin. Chir.*, xvii.

TINCTURA CARDAMOMI COMPOSITA.

BY FRANK M. WILSON.

Read before the Connecticut Pharmaceutical Association, Feb. 8, 1882.

QUERY.—The compound tincture of cardamom of the Pharmacopœia precipitates badly. Can any proper substitute for the honey be used which will be an improvement?

This preparation has always been considered one of the elegant tinctures, highly esteemed therapeutically for its carminative properties, either by itself or in combination with stomachics; it is largely employed as a flavoring and coloring agent, with or without viscid ingredients; hence it is one of the important tinctures of the Pharmacopœia. Our query truthfully says the official tincture "precipitates badly," and inquires for a remedy, a substitute for the honey, to which it attributes the precipitation. As the honey of commerce is, in the main, artificially produced from glucose, the common adulterant of saccharine principles, in the manufacture of which more than twelve million bushels of corn were manipulated last year in this country alone, by submitting the starch to the action of dilute sulphuric acid and heat, saturating it with some earthy carbonate to remove the acid, and purifying; and as glucose is a cheap, imperfect substitute for pure bees' honey, aggravating dyspeptic symptoms, setting up fermentative processes, causing flatulence and painful affections of the bowels, it may be well to eliminate it from the working formulæ on therapeutic grounds.

The British Pharmacopœia employs raisins where that of the United States directs honey. My friend, Mr. Sykes, has used the British formula with gratifying results, producing a more perfect tincture. I have had no experience with it. After accepting this query I began, in a small way, a series of experiments by preparing a quantity of the tincture by the U. S. P. process of percolation, save that I mixed the whole drugs and ground them together, as I believe that to be the better proceeding with all compound tinctures. I prepared three sixteen ounce bottles, and filled them with the tincture; to one I added honey in the requisite proportions; to the second, syrup (U. S. P. specific gravity 1.317); and to the third, Bower's glycerin; these were severally filtered, tightly stoppered and, March 1st, set in line, where they were subject to the light and changing spring and summer temperature of the shop. At the expiration of twenty-four hours,

in the officinal honeyed tincture was observable traces of precipitation in flocculæ; in two weeks' time a thick, unsightly sediment had fallen to the bottom. At this time the tincture containing the cane sugar was found to be in a state of precipitation, though not to the extent of the officinal, and at this writing, ten months from date of manufacture, contains fifty per cent. less of sediment. The sample containing glycerin did not exhibit signs of precipitation for some weeks, but at the end of three months had cast down an objectionable amount of extractive matter, but much less than either of the others. I could have stopped here and complied with the requirements of the query by offering glycerin as a proper substitute for the honey, but my three samples contained precipitates in a greater or less degree, and no one of them came up to the standard of a perfect tincture, which should be a *perfect solution, remaining transparent*. Inasmuch as the carminative and stimulating properties of the ingredients, cardamom, caraway and cinnamon, consist in their volatile oils, and knowing that alcohol was the better solvent of these active principles, I reasoned that an increase of the alcoholic strength of the menstruum would not only make a better solution, but tend to prevent precipitation. I could see no therapeutic objection to thus increasing the volume of alcohol, as the tincture would hardly be administered in large doses; accordingly I prepared a tincture by the following formula:

Cardamom,	4 parts	} No. 50 powder.
Cinnamon,	4 "	
Caraway,	2 "	
Cochineal,	1 "	
Alcohol,	133 "	} To be mixed in the proportion of.
Glycerin,	12 "	
Water,	44 "	
To make	200 "	

Mix the solid ingredients, powder them together, pass through a No. 50 sieve. Moisten the mixture with half an ounce or q. s. of the menstruum, pack in a cylindrical percolator, gradually pour the remainder of the menstruum upon it, afterwards diluted alcohol to obtain 200 parts.

This sample was completed June 15th, and placed with the other three; it has stood a test of seven months and presents an elegant appearance, free from sediment. I would offer the above formula as the best solution of the query my limited experiments have enabled me to deduce.

NOTE ON CONFECTION OF SULPHUR.

BY PETER BOA.

Read at a Meeting of the North British Branch of the Pharmaceutical Society, February 8, 1882.

The formula for confection of sulphur in the British Pharmacopœia was intended, I apprehend, to afford physicians a convenient means of prescribing sulphur in a more elegant way than the old-fashioned one of suspending it in treacle.

That the pharmacopœial preparation has not gained the favor of prescribers, or patients for whom it has been ordered, or superseded to any appreciable extent the old electuary, must, I think, be the experience of most of us. This is due, I believe, to the fact that it is unsatisfactory. When kept even for a few days, separation occurs, the sulphur subsides and the syrup remains on the top, necessitating a new mixing before a dose can be taken. And if it only be considered how nasty an operation it is to stir it up, say in a 2-ounce pot, especially if the pot be nearly full, it need not cause surprise that patients reject it on this account.

Recently prepared it is very elegant and palatable, and under the conviction that if it could be made in such a way as to retain the sulphur in complete and permanent suspension it would be a most acceptable form in which to administer this medicine, I have from time to time tried various expedients with a view to accomplish this. After a considerable number of unsuccessful experiments, which I need not here describe, it occurred to me to try tragacanth. At first I used too much and the result was a confection of too firm consistence. However, the separation was most effectually prevented, and my next proceeding was to determine the smallest quantity of the gum that would effect this. The quantity which I have found to give most satisfactory results is 2 grains to an ounce. The confection prepared with this addition appears to be all that could be desired; it is soft yet inseparable.

Samples are shown prepared with the addition of the tragacanth, and according to the formula in the Pharmacopœia, at the same time, and it will be seen that those containing the tragacanth are in perfect condition, while the others have a stratum of supernatant syrup which can be poured off without disturbing the sulphur.

With this suggested addition the formula for confection of sulphur would read thus :

Sublimed sulphur,	4 ounces.
Acid tartrate of potash in powder,	1 ounce.
Tragacanth in powder,	18 grains.
Syrup of orange peel,	4 ounces.

Rub the powders together and mix thoroughly with the syrup.—
Pharm. Jour. and Trans., February 18, 1882.

COLD CREAM, OR THE CERATUM GALENI.

BY JAMES MACKENZIE.

Read at a Meeting of the North British Branch of the Pharmaceutical Society, February 8, 1882.

Though this article may not properly be termed a pharmaceutical preparation, it is yet one which, at certain seasons, is in such popular demand as to render it a matter of interest to the chemist and druggist. It is, besides an article so susceptible of various changes, that, in spite of all that has been done to avert them, new efforts require to be made, in order to secure a stable and uniform preparation.

Galen, the celebrated physician of Pergamos, is accredited with the invention of this well-known unguent. In ancient, as in modern times, it was compounded of very simple constituents, viz., grease, water and perfume, and (need we say) is known in pharmacy under the title of *Ceratum Galeni*. No doubt, very considerable changes have been introduced at different times into its composition, which have affected alike its odor and quality; yet practically the oleaginous ingredient with water has been retained during so long a period as seventeen centuries. We may safely conclude, however, that with all the appliances of modern times the article as prepared in our day must present a marked improvement on the ancient ceratum of Galen.

My object, at present, is not to trace the history of this esteemed preparation, nor to give an account of the manner in which any of the numerous formulas may be compounded; much less is it to give reasons for failure in the efforts of careful pharmacists who have endeavored to effect permanent improvements in the article. Suffice it to say that we know from experience probably more than enough of such things. All I wish to advance is that in presence of the difficulties which present themselves in connection with this ceratum I have been

forced to the conclusion that it is impossible absolutely to secure from the given ingredients of it such qualities as are popularly expected. After careful consideration of past failures, I have ventured to inquire whether the difficulty might not be overcome by one or other of the recent discoveries in chemistry. Accordingly, several months ago, my attention was drawn to an entirely new agent, termed *white adepsine*, a mineral product, which is manufactured under the superintendence of Professor R. Fresenius. The new agent in question is absolutely neutral, chemically pure, void of odor, and unaffected by the action or temperature of the air. It retains the perfect purity of its color after repeated exposure to heat, and it readily combines with oils, whether fixed or essential, in various proportions. Alone, or in substance, the *white adepsine* is rather hard, more particularly after it has been melted. By the addition of pale almond oil, and flavored with the finest otto of roses, a product is formed which may well be termed *cold cream*.

I have prepared and supplied this article, and I find that it is universally liked, and that in point of adaptability it is all that can be desired. In my opinion, white adepsine is a product which will form an important factor in pharmacy and will prove a boon to chemists. It will take the place (as I conceive) of other substances which have not been found so well fitted for certain special ends. I am well aware that this looks like the language of pretension. I am also aware of the common objection to new proposals. To adopt and introduce adepsine, it may be said, is to upset all our associations with an unguent in common use from time immemorial. Admitting all this, it would be nothing strange to hear of constant changes in the annals of chemistry. It would be only one step more in the history of minerals or of the mineral oils. It is permissible to say, in a word, that if by the means proposed a new and better article is introduced, the change from an old to a new formula will, like so many others in our day, be more than justified by the results.

N. B.—The formula which I have adopted is:

To each pound of white adepsine add 2 oz. pale almond oil and $\frac{1}{2}$ dram otto of roses.

Melt the adepsine in a water-bath, then add the oil, and when it assumes a slightly opaque appearance, add the otto and fill into pots in the usual way. Should it be considered desirable to have the rose-water added, it may be combined in the proportion of one part to seven.—*Phar. Jour. and Trans.*, Feb. 18, 1882.

THE EXTRACTION OF FAT FROM NUX VOMICA.

BY T. EDWARD GREENISH.

In the "Pharmaceutical Journal" of November 26, 1881, in a paper by Mr. Hallberg, read before the American Pharmaceutical Association there occurs the following statement:

"A portion of the same nux vomica was exhausted with "benzin," which left upon evaporation about 5 per cent. of a light greenish-yellow fixed oil which did not show any presence of alkaloids."

In the "Year-Book of Pharmacy" for 1875, p. 20, it is stated that Mr. C. Bullock obtained from 4 oz. of oil, separated from the extract by heating, 10.6 grains of alkaloid. ("Am. Jour. Phar.," 1874, p.405.)

In the same publication for 1877, p. 225 ("Am. Jour. Phar.," 1877, p. 3), L. Wolff remarks concerning the treatment of nux vomica by petroleum spirits: "The oil derived from the "benzin" exhaust to make sure of not losing any strychnine or brucine that may be contained therein, should be repeatedly shaken with dilute alcohol until the washings fail to betray to the palate the specific bitter taste of their alkaloids, then the washings must be mixed with the extract in the course of evaporation."

Wolff used a petroleum spirit, but Hallberg does not specify the origin of his solvent. I take it, however, without doubt to be the same petroleum spirit as is generally used in America for such purposes as extraction of fat, etc. (See Maisch, "Am. Jour. Phar.," 1872, p. 334.)

The presence of oil in extract of nux vomica was an objection which induced me about two years ago to try the process of percolation with petroleum spirit; but on shaking the oil thus obtained with water acidulated with dilute sulphuric acid, and adding potash to the acid solution after separation, the quantity of alkaloid precipitated was so large that the process was not adopted.

My experience being, therefore, contrary to that of Mr. Hallberg, I resolved, on reading his paper, to estimate the amount of alkaloids extracted with the oil by petroleum spirit. With this object in view I percolated 8 oz. of powdered nux vomica with the spirit until exhausted of oil. The product, measuring 10 oz., was shaken repeatedly with water acidulated with sulphuric acid, and the acid solutions were concentrated to a small bulk and precipitated with solution of caustic soda. The precipitate, washed and dried at 100°C., weighed

·3185 gram. The filtrate and wash water were shaken with chloroform and the chloroform solutions evaporated to dryness; the residue (principally brucia), dissolved in acidulated water and precipitated with soda, weighed ·0385 gram.

This gives a total of ·357 gram of alkaloids from 8 oz. (or 227 grams) of nux vomica, or ·157 per cent., a quantity equal to about $\frac{1}{3}$ of the total amount of alkaloids contained therein. From this it is evident that petroleum spirit will remove a considerable proportion of strychnine and brucine from nux vomica, and the resulting extract will be correspondingly deficient in active principle. In the above experiment the nux vomica, although exhausted of oil, continued to yield its alkaloids to petroleum spirit.

I have found, however, that percolation with coal-tar benzol extracts no alkaloid. It cannot, therefore, be the fixed oil which carries the alkaloid into solution, as is sometimes assumed in similar cases.

Should a dry extract be required, care must be taken to shake the solution with acidulated water and to precipitate the alkaloids as above, or to remove them by dilute alcohol, as recommended by Mr. Wolff.

I may add that the hydrocarbon spirit used was a petroleum product, sp. gr. ·700.—*Phar. Jour. and Trans.*, Jan. 14, 1882.

POISONING BY ACONITINE.

BY P. C. PLUGGE.

Abstract of a paper in the "Archiv der Pharmacie" for January.

In April, 1880, a case of death by poisoning occurred at Winschoten, in Holland, which was supposed to have been due to an error in dispensing a mixture containing nitrate of aconitine. In connection with the judicial investigation, the authorities submitted to Professors Plugge and Huisinga, of Groningen, (1) a mixture, (2) three samples of nitrate of aconitine and (3) the residue from the evaporation of benzol that had been shaken with the vomit and the contents of the stomach and intestines of the deceased, with a request that they would report upon their relative poisonous properties.

The three samples of nitrate of aconitine were labeled respectively (b) Aconitin nitric., from Mastenbroek & Gallenkamp (the firm by whom the mixture was dispensed); (c) Aconitin nitric., from E. Merck, of Darmstadt, and (d) Aconitin nitric., from Friedländer, of Berlin.

The first examined was the nitrate of aconitin labeled (b), since it was the kind used in dispensing the mixture, the prescription for which was as follows :

R Aconitini nitrici, 0·2
Tinct. chenopodii ambrosioid., 100
D. S. hourly, 20—40—60 drops.

It appears that the physician intended Friedländers nitrate of aconitine; but, as he did not say so, the dispenser used a preparation he had in stock and which had been obtained originally from Petit, of Paris. It consisted of hard white crystals, which were difficultly soluble in cold water. A 0·2 per cent. solution was prepared for subcutaneous injection in experiments upon frogs, rabbits, dogs and pigeons.

The sample of Merck's nitrate of aconitine (c) was a yellow-brown powder, which dissolved easily in water. As a weaker action was anticipated from this preparation, a 1 per cent. solution was used.

The sample of Friedländer's nitrate of aconitine was a hard, grayish-white, agglutinated gummy mass, very soluble in water. Of this a 1 per cent. solution was used.

The physiological phenomena following the injection of these different solutions are minutely described in the original paper. The difference between the action of Petit's preparation and that of Merck's appeared to be quantitative only, no qualitative difference being observed. Both were powerful heart poisons, death resulting from stoppage of the heart's action. Friedländer's preparation apparently differed in not affecting the heart so much, in proportion to the development of the other aconite symptoms, such as a chewing motion of the mouth, flow of saliva, difficulty of breathing, dyspnoea, etc.

The relative activity of the preparations is shown in the following tables :

(b) *Nitras Aconitini, from Petit, Paris.*

	Dose.		Effect.
Frogs,	0·4 mg. = per kilo	16 mg.	Death in 60 minutes.
Rabbits,	0·8 mg. "	0·5 to 0·6 mg.	Death in 30 minutes.
Dogs,	1·6 mg. "	0·21 mg.	Death in 20 minutes.
"	0·45 mg. "	0·10 mg.	Death in 140 minutes.
"	0·50 mg. "	0·054 mg.	Recovered.
"	0·66 mg. "	0·075 mg.	Recovered.
Pigeons,	0·07 mg. "	0·22 mg.	Death in 21 minutes.

(c) *Nitras Aconitini, from Merck, Darmstadt.*

	Dose.		Effect.
Frogs,	0.4 mg. = per kilo	16 mg.	Recovered.
"	1.0 mg. "	40 mg.	Death in 120 to 360 hours.
"	2.0 mg. "	80 mg.	Death in 75 to 130 hours.
"	4.0 mg. "	160 mg.	Death in 52 hours.
Rabbits,	3.5 mg. "	2 mg.	Death in 75 hours.
"	10.0 mg. "	6.52 mg.	Death in 15 hours.
Dogs,	10.0 mg. "	1.65 mg.	Death in 15 hours.
Pigeons,	0.4 mg. "	1.65 mg.	Recovered.

(d) *Nitras Aconitini, from Friedländer, Berlin (= Trommsdorf, Erfurt).*

	Dose.		Effect.
Frogs,	4 mg. = per kilo	160 mg.	Recovery.
"	10 mg. "	400 mg.	Death after 60 hours.
"	20 mg. "	800 mg.	Death after 60 hours.
"	40 mg. "	1,600 mg.	Death after 60 hours.
Rabbits,	6 mg. "	4.11 mg.	Recovered.
"	24 mg. "	10 mg.	Recovered.
"	50 mg. "	85.5 mg.	Recovered.
"	28 mg. "	6 mg.	Recovered.
Pigeons,	10 mg. "	33.4 mg.	Recovered.

The quantity of this preparation at the disposal of the experimenters did not allow of an estimate being made of a lethal dose for a warm-blooded animal, but when administered to rabbits in the proportion of 85.5 mg. per kilo of the animal's weight it produced tolerably strong symptoms of poisoning.

From the above figures the following conclusions are drawn :

(1) Petit's nitrate of aconitine has a poisonous action at least eight times stronger than that of Merck's, and one hundred and seventy times stronger than that of Friedländer's.

(2) Merck's nitrate of aconitine has a poisonous action at least twenty to thirty times stronger than that of Friedländer's.

It also appears from the foregoing that the preparations known as "German aconitine" are not always of the same strength, there being a much greater difference between the two German preparations examined than between the more powerful of the two and the French preparation.

In conclusion the author emphasizes the necessity—seeing the great possibility of variation in preparations sent into the market—that physicians should exercise the greatest care in prescribing aconitine and its salts, as the dispensing of a different preparation from that intended by the prescriber may lead to the administration of a fatal

dose, as in the case under investigation, where, instead of Friedländer's preparation, which was intended but not specified by the prescriber, that of Petit, which was one hundred and seventy times stronger, was used. The author also recommends that the official maximum dose in the Dutch Pharmacopœia, of 4 milligrams, or 32 milligrams daily, should be struck out, as in this case it proved fatal.

Comparative experiments with the mixture confirmed the statement that Petit's preparation had been used in dispensing the mixture. Only negative results were obtained with the residue from the vomit, etc.—*Phar. Jour. and Trans.*, Feb. 18, 1882.

CHINESE METHOD OF MANUFACTURING VERMILION.

BY HUGH MACCALLUM.

Read before the North British Branch of the Pharmaceutical Society.

There are three vermilion works in Hong Kong, the method of manufacture being exactly the same in each. The largest works consume about six thousand bottles of mercury annually, and it was in this one that the following operations were witnessed :

First Step.—A large, very thin iron pan, containing a weighed quantity, about 14 pounds, of sulphur, is placed over a slow fire, and two-thirds of a bottle of mercury added ; as soon as the sulphur begins to melt the mixture is vigorously stirred with an iron stirrer until it assumes a black pulverulent appearance with some melted sulphur floating on the surface ; it is then removed from the fire and the remainder of the bottle of mercury added, the whole well stirred. A little water is now poured over the mass, which rapidly cools it ; the pan is immediately emptied, when it is again ready for the next batch. The whole operation does not last more than ten minutes. The resulting black powder is not a definite sulphide, as uncombined mercury can be seen throughout the whole mass ; besides, the quantity of sulphur used is much in excess of the amount required to form mercuric sulphide.

Second Step.—The black powder obtained in the first step is placed in a semi-hemispherical iron pan, built in with brick, and having a fireplace beneath, covered over with broken pieces of porcelain. These are built up in a loose porous manner, so as to fill another semi-hemispherical iron pan, which is then placed over the fixed one and securely luted with clay, a large stone being placed on the top of it to assist in

keeping it in its place. The fire is then lighted and kept up for sixteen hours. The whole is then allowed to cool. When the top pan is removed the vermilion, together with the greater part of the broken porcelain, is attached to it in a coherent mass, which is easily separated into its component parts. The surfaces of the vermilion which were attached to the porcelain have a brownish-red and polished appearance, the broken surfaces being somewhat brighter and crystalline.

Third Step.—The sublimed mass obtained in the second step is pounded in a mortar to a coarse powder, and then ground with water between two stones, somewhat after the manner of grinding corn. The resulting semi-fluid mass is transferred to large vats of water, and allowed to settle, the supernatant water removed, and the sediment dried at a gentle heat; when dry, it is again powdered, passed through a sieve and is then fit for the market.—*Pharm. Jour. and Trans.*, December 17, 1881.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Amygdalus communis.—In a thesis recently presented to the California College of Pharmacy Martin J. Murphy states that almonds are grown in most parts of that State and that considerable loss was caused by frosts in districts unsuited to the culture. The almond tree does best in the coast mountain valleys in the central and southern parts of the State, where they are protected from the frosts and cold winds, and are supplied with atmospheric moisture. The variety best suited to the climate is the Languedoc, which is a late bloomer and thrifty grower. About one hundred trees are planted to the acre, yielding fruit when 3 years old of an average value of \$50, 4 years \$200, 5 years \$500, 6 years \$1,000, 7 years \$1,500, 8 years \$2,000, older trees bearing more fruit. The average price of sweet almonds is 14 cents, and of bitter almonds 10 cents per pound; the latter are not cultivated to any great extent in California. The bleaching process, employed for giving the almonds uniform appearance and for destroying insects, consists in burning sulphur upon trays on which the almonds are placed. In three experiments the author obtained from California bitter almonds 39.5, 34 and 32.7 per cent. of fixed oil (by expression?).

Heteromeles arbutifolia, J. Roemer, nat. ord. Rosaceæ, is known as

laurel hawthorn, the *toyoy* or *tollou* of the Indians, and grows in the coast range of California. The leaves yielded to D. D. Lustig hydrocyanic acid, volatile oil, tannin, gallic acid, resins, fat, wax, gum, coloring matter and chlorophyll. The fruit is eaten by the Indians.—*Proc. Calif. Coll. Phar.*, 1882, p. 59.

Thevetia nereifolia.—Prof. C. I. H. Warden, of Calcutta, has isolated from the seeds of this plant a peculiar principle, *pseudoindican*, which with acids yields a blue coloring matter, thevetin blue. The seeds were deprived of oil, digested with alcohol, the thevetin separated by concentration and filtration, and the liquid agitated with chloroform. The solution of the chloroform extract was neutralized with sodium carbonate, precipitated with basic lead acetate, the filtrate freed from lead, concentrated, and the residue treated with warm amylie alcohol, which left extractive matter behind. Thus obtained pseudoindican contains a trace of thevetin, is noncrystalline, bright yellow, transparent, easily pulverizable, slightly hygroscopic, readily soluble in water, alcohol and methylic and amylie alcohols, neutral in reaction and of an unpleasant taste, free from bitterness and acidity. Aqueous solutions acquire immediately a bright blue color with concentrated hydrochloric acid, but with the dilute acid no change is produced until after the application of heat, when blue flocks are separated; the colorless filtrate gave marked indications of the presence of glucose.

Concentrated sulphuric acid produces in a dilute aqueous solution a yellow color, rapidly changing to green, then to blue, with separation of blue flocks, and on gently heating the color changes to a cherry red or rich purple. Solid pseudoindican is colored yellow by sulphuric acid; the color rapidly deepens, on heating changes to cherry red, and on largely diluting with water, to purple or blue with separation of reddish or bluish flocks.

Pseudoindican is colored yellow and oxydized by nitric acid, not altered by acetic acid, and yields a dirty greenish-blue color on being evaporated with phosphoric or tartaric acid.

The *thevetin-blue* after drying is a dark brownish or black amorphous powder, insoluble in water, soluble with a brown color in sulphuric acid, and this solution yields a blue precipitate with water. The bluish-green solution in hydrochloric acid, diluted with water, yields blue flocks on heating. The reddish-brown solutions in caustic alkalies yield blue precipitates with acids. Compared with Kuhl-

mann's cottonseed-blue (Gmelin's Handbook, xvi, p. 459) the following differences are observed:

	Cottonseed Blue.	Thevetin Blue.
Reducing agents,	Not altered,	Not altered.
Oxidizing agents,	Decomposed.	Decomposed.
Water,	Insoluble,	Insoluble.
Hydrochloric acid,	Insoluble,	Soluble.
Acetic acid,	Insoluble,	Soluble.
Phosphoric acid,	Insoluble,	Slightly soluble.
Sulphuric acid,	Soluble,	Soluble.
Aqueous alkalies,	Insoluble,	Soluble.

—Phar. Jour. and Trans., Nov. 19, 1881, p. 417.

Fixed Oil and Poisonous Principle of Thevetia nereifolia.—Dr. J. E. de Vrij ascertained in 1863 that 1,500 grams of air dry seeds weighed after complete drying 1,378 grams, and these yielded by expression 490 grams, or 35.5 per cent. of fixed oil, which is limpid, almost colorless, of a mild taste, solidifies at 13°C., and, according to Oudemans (1866), consists of 63 per cent. olein and 37 per cent. palmitin with stearin. The presscake yielded 4 per cent. of white crystallized bitter *thevetin*, a glucoside which like its derivative *theve-resin* is a narcotic poison. The chemical investigation was made by Dr. C. Blas in 1868, and published in "Bulletin de l'Acad. roy. de méd. de Belg." (3), ii, No. 9.—*Ibid.*, Dec. 3, p. 457.

Rhododendron occidentale.—Chas. M. Troppman found in the leaves an acid resin soluble in ether, resin soluble in alcohol, chlorophyll, fat, tannin, glucose, wax, albumen and pectin; neither arbutin nor volatile oil could be detected. Two grains of the alcoholic extract produced upon the author a burning sensation in the mouth and throat, continued cough, pain in the stomach, nausea and flushed countenance. Ten grains given to a dog induced vomiting and purging, and 7½ grs. administered subcutaneously killed a rabbit in three hours.—*Proc. Calif. Coll. Phar.*, 1882, p. 58.

California Raisins.—We learn from exchange papers that during the past year 150,000 boxes of raisins have been put up in California.

Gentianose, $C_{36}H_{66}O_{31}$, is a saccharoid isolated by Arthur Meyer from gentian root, by adding $\frac{2}{3}$ volume of alcohol to the freshly expressed juice and then precipitating fractionally with ether. The last precipitates were free from gum, dissolved in boiling strong alcohol and the solution crystallized in an exsiccator over burned lime. When pure the crystals are scaly, white, of a scarcely sweet taste, readily soluble in water, fusible at 210°C., readily fermentable with yeast,

turn brown by sulphuric acid and do not reduce Fehling's solution; its specific rotation was $+65.7^{\circ}$ when dissolved by heat, and $+33.36$ when dissolved cold. On treatment with dilute sulphuric acid an invert sugar was obtained, which fermented readily, rotated -20.2° at 18°C ., reduced Fehling's solution like glucose, and could not be obtained in crystals.—*Zeitschr. f. Physiol. Chem.*, vi, No. 2.

Pinguicula vulgaris, Lin., popularly called butter-wort, according to Prof. Russow, contains crystalloids in the epidermis of the upper and more numerous of the lower surface of the leaves, in the epidermis of the peduncle, in the stipe cells of the glandular hairs and in the pointed hairs of the throat of the corolla. These crystalloids form quadrangular plates with sharp edges, are packed together like coin in rolls, and have a diameter of 4 micromillimeters. The rather copious secretion of albuminous crystals in the cells of the vegetative region may possibly have some relation to the well-known insectivorous properties of butterwort.—*Ph. Zeit. Russl.*, 1881, p. 891; *Sitz. Dorp. Naturf. Ges.*

The Olive tree was first planted in California in 1769 by the Spanish missionaries at San Diego, the variety being probably a wild one, as its fruit is smaller and not so abundant as the French and Italian varieties. Jerome J. B. Argenti, in a thesis to the California College of Pharmacy, states that the olive is now extensively cultivated in the southern and central portions of that State for the manufacture of the oil. From the comparison of meteorological tables the author finds the climate of Colfax to be similar to that of Rome, Sacramento to Naples, Los Angeles to Alexandria, Chico to Jerusalem, and thinks that the olive may be still more extensively grown in California. The tree thrives best in a dry calcareous and sandy soil, and can be propagated by seeds, slips, cuttings, suckers and from the small swellings or knots called *novoli* by the Italians. When the seed is used, the pulp of the fruit is removed, the stone is soaked in strong lye to soften it, and is then planted and occasionally watered, the seedling being transplanted when two or three years old.

Cotton-seed Oil contains a yellow unsaponifiable oily body, and its admixture with olive oil may, according to Roediger, be detected by saponifying the oil and treating the nearly dry soap with benzin, on the evaporation of which golden-yellow drops are left behind. This yellow oil causes the ugly yellow spots in soaps made with cotton-seed oil.—*Chem. Zeitung*, 1881, p. 623.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

The use of Quillain for emulsions was described by S. A. McDonnell in a paper read before the California College of Pharmacy, January 12, 1882. The name quillain is suggested for the dry aqueous extract of quillaia bark, as being short and expressive. The yield of the brownish colored extract, made by boiling, is from 20 to 25 per cent.; its taste is sweetish with an acrid aftertaste, and it is easily pulverizable and not hygroscopic; it may also be obtained in transparent scales by drying it on plates of glass, and though it may be obtained colorless by treatment with animal charcoal, this is not deemed necessary, since the brown extract will yield a very white emulsion. It dissolves quickly in water, and such a solution, agitated with twice its bulk of any fixed oil, very readily yields a perfectly homogeneous emulsion, which on standing for two or three days may show a partial separation of turbid watery liquid, this being intimately united again with the emulsified oil by gentle agitation. A non-separating, but much thicker, emulsion may be made by using quillain gr. ix, water $\bar{3}$ i and oil $\bar{3}$ ix. Emulsions containing quillain, but no sugar, have been kept on hand for a year without spoiling. The author gives the following practical formulas:

R Quillaini,	gr. ii	R Quillaini,	gr. iv
Aque,	$\bar{3}$ ii	Aque,	$\bar{3}$ i
Olei Ricini,	$\bar{3}$ ii Misce.	Olei Morrhue,	$\bar{3}$ iv
R Quillaini,	gr. iii	Syr. Hypophosphit.,	$\bar{3}$ iii
Aq. Cinnamomi,	$\bar{3}$ liiss	Olei Aurantii,	gtt. v Misce.
Olei Ricini,	$\bar{3}$ lii	R Quillaini,	gr. i
Glycerini (vel Syrupi),	$\bar{3}$ ss	Aque Gaultheriæ,	$\bar{3}$ vii
		Oleoresinæ Filicis,	$\bar{3}$ i Misce.

The ingredients are designated in the order in which they should be mixed. (See also paper by H. Collier in "Amer. Jour. Phar.," 1880, p. 41.)

Emulsion of Codliver oil with Hypophosphites.—F. Grazer proposes to prepare this with a tincture of quillaia made by digesting 4 oz. of the bark with 24 oz. of water and 8 oz. of alcohol. Two ounces of the tincture are heated to evaporate the alcohol, mixed with 2 oz. of glycerin and the necessary quantity of hypophosphites, when the mixture is beaten into a creamy state by means of an egg beater. Twelve ounces of codliver oil are next added in small quantities, being pro-

perly emulsified after each addition, and flavored with essential oil of almonds. The odor and taste of the oil is thus completely disguised. The emulsion is thick, requiring a wide mouth bottle, is permanent, a slight separation which may take place being easily remedied by a little agitation, and mixes in all proportions with water without separating any oil globules; it is easily made, palatable, and contains 75 per cent. of codliver oil.—*Proc. Calif. Coll. Phar.*, 1882, p. 31, 32.

Tooth Wash.—E. W. Runyon contributes the following formula:

Take of White oak bark,	2½ ounces.
Rhatany root,	½ ounce.
Sassafras bark,	1 drachm.
Red cinchona,	3 drachms.
Cardamom seeds,	30 grains.
Ceylon cinnamon,	20 grains.
Cloves,	30 grains.
Oil of wintergreen,	1 fluidrachm.
Oil of anise,	½ fluidrachm.
Alcohol,	20 fluidounces.
Water,	12 fluidounces.

The drugs are finely ground and macerated in the liquids for ten days; then filter.—*Ibid.*, p. 51.

Flour paste is made by thoroughly mixing flour 4 oz. with water 1 pint, straining through a sieve, adding nitric acid 40 minims, and heating until thoroughly cooked; when cold, 5 minims each of oil of cloves and carbolic acid are added. In the dry climate of California the addition of 5 per cent. of glycerin prevents the paste from drying up too soon.—*Ibid.*

EMULSIONS.

BY C. LEWIS DIEHL.

Among the many preparations that manufacturers of pharmaceutic specialties have made much capital out of in recent years, emulsions of codliver oil take a very prominent place. From the claims set forth in their advertisements—which may be either by label, by circular, or by personal interview of the manufacturer's agent—one is easily led to believe that not alone superior knowledge and skill are requisite in their production, but also that their successful production is possible only with the aid of expensive machinery and the advantages that are derived from abundant capital and a particularly favored market. Yet nothing is further from the truth; for while it is not disputed

that a certain amount of knowledge and skill are required, that machinery is a necessity to the production of emulsions in large quantities, and that capital and a good market are advantageous in a commercial sense, their production requires no more knowledge and not as much skill as does the compounding of most of the prescriptions daily put up in our pharmacies, while all the apparatus necessary are a mortar and pestle and accurate implements of measurement. These, with good, fresh codliver oil—which can be obtained without difficulty—make the production of an emulsion as easy an operation as the compounding of the simplest prescription. Moreover, such emulsions possess real advantages over the manufactured article. They are, in the first place, perfect emulsions, which the commercial products in many cases are not. Then being prepared at the time when they are prescribed, they are absolutely fresh; and there is perhaps no class of preparations in which this is more desirable. It is true the manufacturers usually claim that their emulsions keep well; but at the same time they are very careful to recommend that such be kept in a cool place. The truth is that notwithstanding such care the preparations furnished soon undergo change, become unsightly and unfit for use; and if it is further considered that this care in their preservation cannot always be observed, and, as a rule, is disregarded both by the wholesaler and retailer, it cannot be wondered that manufactured emulsions are often dispensed in a very unsatisfactory condition.

These considerations have suggested to me the propriety of offering some formulas for emulsions, in the hope that in the absence of authoritative formulas physicians may find them of sufficient merit to adopt them in their practice; giving them at the same time the assurance that careful pharmacists following them will succeed as well as I have succeeded in preparing them.

The successful formation of emulsions, whether of fixed or volatile oils, is dependent upon certain rules, well understood by accomplished pharmacists, which when deviated from will invariably embarrass the operator, either by retarding or completely preventing perfect emulsification. These rules are:

1. That the water and gum arabic¹ shall be in definite and absolute

¹ The writer is well aware that other emulsifying agents have been proposed and are used, but he is satisfied that none of these answer as well as does gum arabic.

proportion to each other. This proportion is three (3) parts of water to two (2) parts of gum, both by weight.

2. That the relation of oil to gum (and water) shall be definite within certain limits; that is to say, the mucilage formed in the above proportions is capable of perfectly emulsifying a minimum and a maximum proportion of oil. The minimum proportion is two (2) parts of oil to one (1) part of gum; the maximum proportion is four (4) parts of oil to one (1) part of gum.

3. That the trituration of the oil, gum and water be continued till a perfectly homogeneous, milky-white, thick-creamy mixture is formed—i. e., until perfect emulsification takes place—before the addition of a further quantity of water or other liquid.

The thick creamy emulsion obtained, if the above conditions are fulfilled, must be the basis of all perfect emulsions. It will bear dilution to any extent with water, forming mixtures varying, according to the proportion added, from the appearance and consistence of cream to that of very thin milk. Obviously the water may be substituted by solutions of saline compounds, syrups, etc., and this enables the production of the various combinations of codliver oil in current use from the above thick-creamy emulsion, which for distinction I shall designate as

I. *Concentrated Emulsion of Codliver Oil.* Take of fresh Norwegian codliver oil eight (8) troyounces; powdered gum arabic, two (2) troyouncee; distilled water, three (3) troyounces. First weigh the gum into a wedgewood or porcelain mortar, then the oil, and triturate till the gum is well mixed with the oil; then weigh into the mixture the distilled water, and triturate the whole briskly until the mixture thickens and acquires a pasty consistence and milky whiteness. Now scrape down the portions adhering to the sides of the mortar and to the pestle, and continue the trituration for a short time, after which add such other ingredients as may be desirable or transfer the concentrated emulsion to a wide-mouthed bottle for future use.

This concentrated emulsion will keep for a reasonable time in cold weather, and, if placed in the ice chest, also during warm weather. It may therefore be kept in stock if the demand for emulsions is brisk enough to justify it; but inasmuch as its preparation does not consume more than five or ten minutes, it is advised to always prepare it fresh, or, at all events, never to prepare more than a week's supply, particularly in summer. Its consistence is such that it is poured out of the

containing vessel with difficulty; hence the necessity of using one with a wide mouth, which should be as securely stoppered as possible, and should be cleaned very carefully each time it is refilled. All this takes time and involves trouble, which is prevented by preparing the concentrated emulsion only as required.

II. *Simple Emulsion of Codliver Oil.* Take of concentrated emulsion of codliver oil thirteen (13) troyounces; oil of wintergreen, twenty-four (24) drops; syrup, one (1) fluidounce; water, three (3) fluidounces. Weigh the concentrated emulsion into a mortar, add the oil of wintergreen, and triturate thoroughly; then gradually add first the water and then the syrup.

The manipulation for this emulsion is typical for all the other codliver oil emulsions given below. It has the consistence of very thick cream, but is readily poured out of narrow-mouthed bottles, is milky white, and mixes readily with water or other liquids that may be administered with it. It contains exactly fifty per cent. (by volume) of oil, the quantity that manufactured emulsions are said to contain, although I have convinced myself that some of them do not contain that proportion. The oil of wintergreen disguises the odor of the codliver oil very admirably, and has the further advantage that it acts as a preservative.

III. *Emulsion of Codliver Oil with Hypophosphite of Lime.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium are dissolved in the water, each tablespoonful of the finished emulsion containing four grains of that salt.

IV. *Emulsion of Codliver Oil with Hypophosphite of Lime and Soda.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium and ninety-six grains of hypophosphite of sodium are dissolved in the water, each tablespoonful of the finished emulsion containing four grains of the calcium and three grains of the sodium salt.

V. *Emulsion of Codliver Oil with Hypophosphites.* This differs from the simple emulsion in that one hundred and twenty-eight grains of hypophosphite of calcium, ninety-six grains hypophosphite of sodium, and sixty-four grains of hypophosphite of potassium are dissolved in the water; each tablespoonful containing four grains of the calcium, three grains of the sodium, and two grains of the potassium salt, and

corresponding to a teaspoonful of Churchill's syrup of the hypophosphites.

VI. *Emulsion of Codliver Oil with Phosphate of Lime.* This differs from the simple emulsion in that two hundred and fifty-six grains of phosphate of calcium are dissolved in the water by the aid of one hundred and twenty-eight grains of hydrochloric acid;¹ each tablespoonful containing eight grains of the phosphate held in pleasantly-acid solution.

VII. *Emulsion of Codliver Oil with Phosphate of Lime and Soda.*—This differs from the simple emulsion in that two hundred and fifty-six grains of phosphate of calcium and sixty-four grains of phosphate of sodium are dissolved in the water acidulated with one hundred and twenty-eight grains of hydrochloric acid; each tablespoonful containing eight grains of the calcium and two grains of the sodium salt.

VIII. *Emulsion of Codliver Oil with Lactophosphate of Lime.* This differs from the simple emulsion in that two hundred and fifty-six grains of lactate of calcium dissolved in two fluidounces of diluted phosphoric acid are substituted for two fluidounces of the water, each tablespoonful containing eight grains of lactate of lime or about ten grains of lactophosphate.

IX. *Emulsion of Codliver Oil with Wild-cherry Bark.* This differs from the simple emulsion in that the oil of wintergreen is replaced by eight drops of oil of bitter almonds, and in that one fluidounce of the fluid extract of wild-cherry bark is substituted for one fluidounce of the water; each tablespoonful containing fifteen minims of the fluid extract and one-fourth of a drop of oil of bitter almonds.

Other combinations of codliver oil with different medicinal agents may be effected in the same way as pointed out in the above, or the proportions of salts may be varied to suit particular cases. The process for the concentrated emulsion also may be applied to the emulsification of other oils, as, for instance, in the following:

X. *Emulsion of Castor Oil.* Take of castor oil four (4) troy ounces; powdered gum arabic, one (1) troyounce; distilled water, one and one half ($1\frac{1}{2}$) troyounce; syrup, cinnamon water, of each three (3) fluidounces; spirit of cinnamon, twelve (12) minims. Emulsify the oil with the gum and distilled water as directed under I, then add the

¹ The use of hydrochloric acid instead of phosphoric acid is preferred, because the large quantity of the latter required would make the preparation unpleasantly sour.

other ingredients successively with constant trituration. This emulsion contains thirty-three per cent. of castor oil, and is consequently more limpid than the fifty per cent. codliver oil emulsions above described, and is in every respect an elegant preparation.

Louisville.

PRESENCE OF PEPTONES IN PLANTS.

BY E. SCHULZE AND J. BARBIERI.

As Gorup-Besanez has demonstrated the existence of albumin solvent ferments in the seeds and other parts of plants, the presence of peptones was to be expected; but experiments with a view of finding these substances have for the most part been unsatisfactory. On the one hand, Kern has found peptones in the extracts of fodder plants, lucerne, vetches, etc., but considers that they were formed during the preparation of the extracts. On the other hand, Kellner maintains that peptones are neither present nor are formed during the process of extraction, if sufficient care be taken. The authors have re-examined the question by the light which the researches of Hofmeister have thrown on the chemical nature and properties of peptones; they have also adopted the methods of separation ("Abstr.," 1879, 183) and the so-called biuret reaction (*i. e.*, red-violet coloration with copper sulphate in alkaline peptones) proposed by Hofmeister. This latter reaction forms a basis for a colorimetric determination of peptone, a number of solutions of standard tints being prepared by dissolving known weights of peptone (from blood fibrin), and adding to them known volumes of soda and copper sulphate solutions. In order to isolate peptone from vegetable extracts, the authors, adopting the method of Ritthausen, have treated the albuminous substance known as conglutin (obtained from lupines) with pepsin solution, and purified the product by the processes used for fibrin peptone. This preparation was not so pure as ordinary fibrin peptone, resembling the latter in its behavior towards tannin and phosphotungstic acid, but differing from it in giving a precipitate with acetic acid and potassium ferrocyanide. The coloration produced from the plant-extract with copper sulphate was of the same tint as that formed with the solution of fibrin peptone of strength 1 : 1,000. Similar results were obtained with other extracts, and the authors have thus demonstrated the existence of peptone in plant-buds, seeds, potatoes of various species, and in the

sap of beetroot, but in all cases in relatively small quantities. In many of the fodder grasses, no peptones were found, but an examination of young plants showed that there were present ferments which, in the course of the preparation of the extracts, acted on the albumins and converted them partly into peptones. Further it was shown that, using suitable methods of extraction, the formation of peptone can either be entirely prevented, or at least modified. An examination of lupine seeds revealed the presence of a substance intermediate between albumin and peptone, similar to the substance obtained by Vines "Abstr.," 1881, 1062, and named by him vegetable peptone. From its properties the authors consider that it cannot be classed as a peptone, but only as a transition substance, resembling the peptone of Schmidt Mülheim. As it was found that in many plant-extracts obtained from various sources, only a small fraction of the nitrogen constituents of the phosphotungstic acid precipitate arises from the peptone, it is probable that a more intimate examination of this precipitate would lead to the isolation of nitrogenous substances; and in an added note the authors suggest that these probably belong to the xanthin class, which have recently been found by Salomon in plant-seeds.—*Jour. Chem. Soc.*, March, 1882, from *Chem. Centr.*, 1881.

CHLOROPHYLL.

BY B. SACHSSE.

The amount of chlorophyll in plants is generally much underestimated. From 125 kilos. of fresh leaves the author has obtained no less than 100 grams of phyllocyanin, which he considers to be the principal constituent of chlorophyll. The numerous attempts which have been made to explain the reduction of carbonic anhydride by the green coloring matter of leaves have so far been without result, and the following hypothesis is, therefore, proposed: Chlorophyll is not the cause of the reduction of carbonic anhydride under simultaneous action of light and protoplasm, as is generally supposed, but is itself the first product of that reduction, the chlorophyll so formed being at once converted into starch and other carbohydrates, which have been usually considered to be the first products of the reduction, and its place supplied by more chlorophyll, resulting from a further reduction of carbonic anhydride. This hypothesis the author endeavors to

submit to the test of experiment by trying whether pure chlorophyll can be made to yield carbohydrates by the action of reducing agents, and more especially sodium. For this purpose a quantity of fresh leaves was treated with alcohol and benzin, according to a method for which the original paper must be consulted, by which means the alcohol takes up chiefly the yellow coloring matters which accompany the chlorophyll, whilst the latter is dissolved by the benzin.

A solution of chlorophyll in benzin was treated with sodium, when, after a lapse of 8 to 14 days, a cloudiness appeared, and gradually assumed the form of a voluminous green precipitate, whilst the supernatant liquid was no longer green but golden-yellow, owing to the presence of a yellow coloring matter (A), which will be subsequently referred to. The green precipitate was a dark green, almost black, mass, of soapy consistence, and was readily soluble in absolute alcohol, forming a brilliant green beautifully fluorescent liquid; it also dissolved in water, forming a similar solution, but less fluorescent. On adding the solution of a metallic salt, *e.g.*, copper sulphate, to the aqueous solution, a dark green voluminous precipitate of the copper salt is obtained, whilst there remains in the filtrate a colorless amorphous body, which has almost the composition of a carbohydrate, but containing rather more hydrogen, and is partially converted by the action of acids into a substance showing the most important reactions of a sugar of the dextrose group. On slightly acidifying the aqueous solution of the original green or fluorescent coloring matter with hydrochloric acid, or on passing in a current of carbonic anhydride, the liquid assumes a golden-green cloudy appearance, which, in the case of the hydrochloric acid, soon settles out as a distinct precipitate, whilst the colorless amorphous substance above referred to remains in solution. The principal constituent of the precipitate is an almost black coloring matter, to which the name phylloeyanin is given. Among the decomposition-products of the original green coloring matter by means of acids are two substances which belong to a class of yellow coloring matters to be subsequently referred to, and another which is of a fatty nature.

The author thinks that the original green fluorescing body is homogeneous, but of a very complicated composition. On analysis, it gave as the extremes of several determinations: 60.96 to 61.88 per cent. C, 9.21 to 9.39 H, 1.99 N, 10.46 to 11.00 ash (which contained sodium, phosphoric acid and magnesium, but no iron).

Phyllocyanin, which really includes several different bodies of a very similar nature, is a dark green, almost black, mass, which is insoluble in water, only sparingly soluble in benzin, and however prepared, is always nitrogenous. It may be separated into three different substances by treatment with hot alcohol. These gave the following composition on analysis :

	C.	H.	N.
A. Insoluble in alcohol, .	67.66-67.77	8.03-8.41	5.46-5.92
B. Difficultly soluble in alcohol, .	69.32-69.71	6.75-7.30	8.24-8.56
C. Easily soluble in alcohol, .	69.14-69.70	7.45-7.60	7.08-7.30

On oxidation with potassium permanganate in alkaline solution, phyllocyanin gives ammonia, oxalic, palmitic, and probably lactic, acetic, and three other acids, which appear to be nearly related to or identical with itaconic, citraconic, and mesaconic acids.

On dry distillation under diminished pressure, phyllocyanin gives palmitic aldehyd ; whilst on dry distillation with lime it gives palmitone, $C_{31}H_{62}O$, or possibly stearin ; on treatment with bromine in aqueous solution, it is decomposed into ammonia, and, at least, three other bodies, one of which is easily soluble in benzin ; the second insoluble in benzin, but easily soluble in alcohol ; and the third insoluble in either solvent.

In the solid state the yellow coloring matter A, referred to above, forms a mass varying in color from brown to yellow, or reddish yellow, of a fatty nature, always free from nitrogen, and varying in composition between 65.88 to 70.90 per cent. C, 7.91 to 9.80 H, and 26.21 to 19.30 per cent. O. Two other coloring matters of a pale yellow were also obtained, although it is very doubtful whether these latter were derived from the chlorophyll, or only admixed impurity ; one of them had a composition represented by the formula $C_{26}H_{52}O_2$. The author considers the yellow coloring matter as the connecting link between the green coloring matters and the true fats, and is also of opinion that several modifications of chlorophyll exist, and that each chlorophyll contains a phyllocyanin, a yellow coloring matter, and a body nearly related to the carbohydrates.—*Jour. Chem. Soc.*, January, 1882, from *Chem. Centr.*, 1881.

MINUTES OF THE COLLEGE.

PHILADELPHIA, March 27, 1882.

The Annual Meeting of the Philadelphia College of Pharmacy was held this day at the Hall of the College, No. 145 North Tenth street. Dillwyn Parrish, President, occupied the chair, and 17 members were in attendance.

The minutes of the last meeting were read and, on motion, adopted.

In the absence of the Secretary of the Board of Trustees, Thomas S. Wiegand read the minutes of the Board during the last six months which were, on motion, approved.

These minutes inform the College that, at the recent commencement, 117 students had the degree of Graduate in Pharmacy conferred upon them, and that two of their number, Messrs. Virgil Coblentz, of Springfield, Ohio, and Jonas G. Clemmer, of Philadelphia, were each awarded a gold medal known as the "Procter Prize," for obtaining the highest average in all branches taught in the College.

Thomas S. Wiegand, Librarian, reported that "the theses and thirty volumes are in the hands of the binder. There have been added by purchase, since last report, 20 volumes."

The Curator's report was then read and, on motion, adopted.

"The Curator would respectfully report that several additions to the Cabinet have been made during the last year, probably the most valuable being the electrical apparatus presented by a graduate of this College—Frederick Gutekunst, Esq. The Pharmaceutical Meetings have been frequent occasions when additions have been made, and have undoubtedly been the cause of increasing the number of specimens to a very useful degree. With the enlarged space now afforded, it is hoped that during the coming summer cases may be furnished to complete the further arrangement of the accumulated specimens. Respectfully submitted,

"JOSEPH P. REMINGTON."

The following report of the Publishing Committee was then read and approved:

"PHILA., March 27, 1882.

"*To the Officers and Members of the Philadelphia College of Pharmacy:*
Gentlemen.—The Publishing Committee respectfully report that the duties assigned them have been performed with care. The JOURNAL has been issued with its accustomed promptness and regularity, and in addition we have issued this year a decennial general index to Vol. 43, year 1871, to Vol. 52, year 1880, inclusive, a copy of which was sent to all regular subscribers of the JOURNAL without extra charge. The committee also decided to reduce the price of the general index to the first 42 volumes of the JOURNAL, from its commencement, Dec., 1825, to Nov., 1870, inclusive. The Editor's report will give in detail his work for the year.

"The committee deem an acknowledgment due to the Business Editor for his attention to the interests of the JOURNAL. His report is herewith submitted with the report of the Treasurer.

"HENRY N. RITTENHOUSE,

"*Chairman of Committee of Publication.*"

The report of the Editor was read and approved.

"To the Philadelphia College of Pharmacy:

"During the past year eighty-seven original communications were published in the JOURNAL, which is the largest number during a series of years, with the exception of the years ending March 1876, 1877 and 1878. The number stated does not include several communications incorporated with the minutes of the Pharmaceutical meetings, nor the editorials, reports of meetings, original translations, gleanings and other abstracts from various—mainly foreign—sources furnished for the JOURNAL by Professors Sadtler and Power and by the Editor. The original papers were devoted to materia medica 38, chemistry 8, pharmacy 34 and 4 to other subjects of general interest, and embraced the investigations contained in 33 theses received by the College last year. The number of authors was 66, of whom three, who are members of the College, contributed respectively 9, 8 and 5 papers. Besides the contributions of these three members, there were published such from two honorary members and further eight papers by seven active members of the College.

"Although three-fifths of the original contributions to the JOURNAL emanated from members of the College, it is the belief of the Editor that a larger number of the members could report their observations, and he would again suggest that, whenever possible, such communications be made at the Pharmaceutical Meetings which are held monthly during eight months of the year. He would also repeat his recommendation made last year, of taking steps for stimulating original research at the laboratories of the College, and would suggest that the reports of the Pharmaceutical Meetings be extended so as to embrace in substance the remarks made on the various subjects coming up for discussion, for which purpose perhaps the employment of a short-hand reporter would be desirable.

"The Editor embraces this opportunity of thanking all friends of the JOURNAL, more especially those who have aided him with contributions and otherwise. Respectfully submitted, JOHN M. MAISCH, *Editor.*"

Charles Bullock, Treasurer of the Publication Committee, read the financial statement for the last year, exhibiting the usual balance in his hands and showing that the committee has been engaged in a good work for the College. The Business Editor's account was also produced and appreciated for its proficiency and correctness.

The resignations of Jacob K. Hecker and G. Henry Kille, as members of the College, were read and accepted, and the Secretary was directed to request a return of their certificates of membership.

The Treasurer of the College reported the names of three members who are five years in arrears to the College. On motion, the Secretary was requested to inform them that, unless the arrears were wholly or in part paid before the next meeting of the College in June, their names will be dropped from the roll.

Charles Bullock, Chairman of the Committee on Deceased Members, alluded to the death of Dr. Robert Bridges, and stated that the matter would claim the attention of the Committee at an early day. He also referred to the death of Thomas P. James, formerly a member of the College, who died in Cambridge, Mass., on the 22d of February last, an obituary notice of whom will be found in the March number of the JOURNAL.

Professor Maisch, alluding to his report as Editor, called the special attention of the meeting to the importance of the Pharmaceutical Meetings, which he said had not been attended during the past season as well as formerly, and greatly regretted the lack of interest which members

apparently manifested therein. Students, who formerly attended these meetings, were not on hand to any extent during the past winter, and a general want of interest was apparent.

To awaken a new interest in these meetings during the coming fall and winter is very desirable, and an invitation to attend the Pharmaceutical Meetings is hereby extended to the members of the College and to all Drug-gists, and chemical and pharmaceutical students.

Exhibitions of new drugs and chemical products are solicited, with such remarks upon them as will throw light upon their origin or manufacture; observations upon combinations and incompatible mixtures at the prescription counter; new means of exposing adulterations, and new methods of preparing pharmaceutical preparations, would be desirable and instructive, and be the means of creating a new interest in these meetings.

Parties desiring to call attention to any subject will confer a favor by notifying the Registrar beforehand, so that notice may be given to members, in order that they may come prepared to discuss the subject.

On motion of Mr. Bullock, the chair appointed Professors Maisch, Remington, Power, Henry Trimble and Dr. A. W. Miller a committee to reorganize the Pharmaceutical Meetings in the coming fall, and to devise plans by which subjects will be chosen for discussion or investigation, papers written and read before the meeting, and such other matters as shall seem to them suitable for increasing the interest and attendance of the meetings.

This being the Annual Meeting, an election for Officers, Trustees and the Standing Committees was ordered.

The chair appointed Messrs. Henry Trimble and Charles A. Weidemann tellers, who, upon taking the ballot, reported the election of the following gentlemen:

President.—Dillwyn Parrish

1st Vice President.—Charles Bullock.

2d Vice President.—Robert Shoemaker.

Treasurer.—Samuel S. Bunting.

Recording Secretary.—William J. Jenks.

Corresponding Secretary.—Alfred B. Taylor.

Board of Trustees (for three years).—William B. Webb, Thomas S. Wiegand, Andrew Blair.

Publication Committee.—John M. Maisch, Henry N. Rittenhouse, Thomas S. Wiegand, James T. Shinn, Charles Bullock.

Sinking Fund Committee.—Thomas S. Wiegand, T. Morris Perot, James T. Shinn.

Editor.—John M. Maisch.

Librarian.—Thomas S. Wiegand.

Curator.—Joseph P. Remington.

No further business being offered, adjourned.

WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 21, 1882.

In the absence of the President Mr. Wm. J. Jenks was called to the chair. The minutes of the last pharmaceutical meeting were read and approved.

Prof. Power read a paper upon homatropine (see page 145). In answer to a question as to what extent homatropine was at present used in medicine, Dr. Wolff stated that it had not by any means supplanted the older remedy, atropine.

Prof. Maisch, on behalf of the British Pharmaceutical Conference, presented a copy of the Year Book of Pharmacy for 1881, and, from the Pharmaceutical Society of Great Britain, a copy of the Calendar of their Society for the year 1882.

Prof. Maisch exhibited specimens of a now quite rare drug, namely, the American *Castor*, with oil sacks attached thereto; these were much fresher than the drug as usually seen in the market, and had a strong castor and smoky odor, the sacks having been partially dried in the smoke. They had been sent by Mr. C. R. Lange, of Scribner, Neb., a graduate of the College.

A query was put as to whether any present were familiar with *chlorinated oil*. In reply Dr. Wolff stated that he had prepared it by passing dry chlorine gas into olive oil, and that, to his surprise, the gas was absorbed to a large amount; that there was a very considerable rise in the temperature of the oil, but there was no acid reaction nor smell of chlorine upon the oil. This chlorinated oil has been used quite successfully in cutaneous affections. Prof. Maisch suggested that an acid reaction would probably be observed on washing the oil with water; at least Lefort had, in 1852, obtained chlorine substitution compounds by treating fats with moist chlorine. Prof. Sadtler stated that he had prepared such substitution compounds of the fatty acids, and that soaps could be made with such acids.

Mr. Trimble called the attention of the meeting to an adulteration which was new to him, viz., that of *extract of liquorice* with extract of logwood; he had endeavored to get a sample of the sophisticated article, but so far had been unable to do so. Mr. Brown stated that he had lately seen an article of powdered extract of liquorice, which, upon attempting to dissolve for the purpose of making brown mixture, proved to be refractory, and examination showed it to be largely contaminated with wheat starch; the article was represented to be of German origin. Prof. Maisch considered this latter statement doubtful, since in that country starch was largely prepared from potatoes, and this was doubtless cheaper there than wheat starch.

Prof. Sadtler presented a copy of a table of the *scales of Baume's hydrometer*, the results of some very careful examinations into the original papers upon the subjects, made by Prof. C. F. Chandler and one of his assistants; and also a table of the valuations of *sulphuric acid* of different degrees of the hydrometer scale.

There being no further business, a motion to adjourn was made and carried.

T. S. WIEGAND, Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

PHILADELPHIA COLLEGE OF PHARMACY.—The examination of the Junior students was held on the afternoon and evening of February 14th. The specimens for examination and recognition were as follows:

Matricaria,	Aqua foeniculi,	Acidum nitro-muriaticum,
Sabbatia,	Syrupus zingiberis,	Acidum phosphoricum dilut.,
Chondrus,	Extract. sennæ fluidum,	Potassii chloras,
	Sodii boras.	

The questions for written answers were the following:

CHEMISTRY.

1. Is the white light of the Sun simple or compound? How many elementary colors are there! What is Spectrum Analysis, and how do chemists utilize it?
2. What is the Electric Light? Give the difference between the "arc light" and the "incandescent light." Which is the more powerful?
3. Write three reactions for the production of Hydrogen.
4. What is Ozone? How is it produced, and what are the tests for it?
5. Give the chemical reaction by which Nitric Acid is made. What is the action of Nitric Acid upon vegetable or animal tissue? What are Nitrates used for in the arts?

BOTANY AND MATERIA MEDICA.

1. Explain the nature of *Cork Cells*. What is the difference between primary and secondary Cork? In what parts of plants is Cork produced?
2. In what respects does a *root* differ from a *rhizome*, both morphologically and in structure?
3. What are the medicinal properties of the plants belonging to the natural order of *Araceæ*? Name some drugs obtained from this natural order.
4. Give the botanical characters of the natural order of *Gentianaceæ*. Name the official herbs obtained from this order. State the medicinal properties of these plants.
5. *Spearmint* and *Peppermint*. Give the botanical names of the plants, and describe both plants, pointing out more particularly in what respects they differ.

PHARMACY.

1. If a *liter* flask holds forty-five and two-thirds *troyounces* of an official liquid at 4°C., what should you say the liquid was? Show the calculation for obtaining your answer.
2. Describe a *Hydrometer* suitable for pharmaceutical purposes. What is the theory of its construction? At which end of a hydrometer for heavy liquids is the specific gravity of water indicated? Why is it placed at this end?
3. Define *Fluid Extract*, *Syrup*, *Tincture*, *Infusion*, *Medicated Water*.
4. Define *Maceration*, and name three preparations wherein this process would be preferably used to percolation, and give your reasons for preferring maceration. Define *Percolation*, and name six preparations in which this process would be preferably used to maceration.
5. State briefly how official *Diluted Phosphoric Acid* is prepared. What do you know about an improvement over the official process? How is this preparation distinguished from other varieties of the same acid?

QUESTIONS BY THE COMMITTEE.

1. In what respect does the *United States Pharmacopœia* differ from a *Dispensatory*? What is meant by the Official name of a drug? Give an example. What is meant by the Botanical name of a drug? Give an

example. What is meant by the Common name of a drug? Give an example.

2. Give the Symbolic formulæ of the five compounds of Nitrogen and Oxygen. Give the physical characteristics and Specific Gravity of the official Nitrogen Acid. State briefly its method of manufacture.

3. What are the physical laws governing the evaporation of liquids?

4. Give the Botanical name and Natural order of the plant which yields the official *Levant Wormseed*. Give the Botanical name and Natural order of the plant which furnishes the official *Wormseed*. State how you would distinguish one of these drugs from the other.

At the practical examination the folding of plain and plaited filters for different funnels was practised, and percolation was started for preparing extract of gentian.

Those students who failed in one or more branches may come up for re-examination in the branches in which they were unsuccessful on the afternoon of Friday, September 29th, at 3 o'clock, when also others will be examined under the rules of the College prior to entering the senior class.

The examination of the students of the *Senior* class commenced on Tuesday, February 28th, and ended on Friday, March 3d, with the examination in practical pharmacy and in the questions propounded by the committee. The questions in the different branches were as follows:

QUESTIONS IN MATERIA MEDICA.

A. Name the *official roots* obtained from the natural order of *Umbelliferae*, and give of each the plant producing it and its habitat. Describe each root briefly, and point out its structural characteristics. Name its important medicinal principles, and give its medical properties and dose.

B. Name the plants, with their habitat, yielding the *official rhizomes* of *Iridaceæ*. Describe the growth of the rhizomes, the place from which overground stems are produced, the arrangement of the leaf scars, and the position of the rootlets. Describe the drugs briefly, showing in what respects they differ, and give their medical properties and dose.

C. What is *Bittersweet*? Name the plant from which it is obtained, its habitat and natural order. When should it be collected? Describe the drug and name its constituents, its medical properties and its dose.

D. Name the plants yielding the *official barks* of *dogwood*, and give the natural order and habitat. Describe the barks as to their characteristic differences. Name the important principles, and give the medical properties and dose.

E. Give the name, natural order, habitat and official part of *foxglove*. When should the drug be collected? Describe it and give an outline of the process for obtaining the medicinal principle. What is the dose of the drug and of the active principle?

F. Give the name, natural order and habitat of the plant yielding *Purg-ing Cassia*. Describe the drug, explain the cause of its division into cells, and state which portion and what percentage of the drug is medicinally employed. Give the origin and characteristic differences of other purging cassias sometimes met with in place of the official article.

G. *Larkspur Seed*. Give the name, natural order and habitat of the plant. Describe the drug and state its medicinal properties. What other drug is sold in its place? From what plant is this derived, and how may it be distinguished from the drug recognized by the Pharmacopœia?

H. What are the *official Nutgalls*? Upon what plant, by what insect, and in what country are they produced? Describe the different layers of tissue, and name the chief constituent of each layer. What causes the light color of white nutgalls? What amount of tannin is contained in

good nutgalls, and what is the chemical relation of this principle to gallic acid?

I. Which official *fixed oils* are obtained from *euphorbiaceous seeds*? In which tissue is the oil contained, and what is the shape and position of the embryo? What percentage of oil may be obtained from each seed, and what is the behavior of these oils to nitrous acid and to alcohol?

K. Give the official name of *Isinglass*, the name, class, habitat and part of the animal yielding it, and the manner in which it is prepared for the market. Describe briefly its characteristic properties and its behavior to solvents.

QUESTIONS IN PHARMACY.

A. Write the answers to the following in the blanks provided for the purpose, showing the method of obtaining the results: 1. How many grains are there in a liter of official Hydrochloric Acid at 4°C.? 2. In one hundred centigrams of Chalk? 3. In an imperial pint of Glycerin? 4. In a troyounce of official Alcohol? 5. In a theoretical teaspoonful of syrup?

B. Give the unabbreviated official names, ingredients, outlines of process, and describe an improvement upon the official method of making the following: Citrine Ointment, Fluid Extract of Ipecac, Benzoated Ointment, Tincture of Kino, Syrup of Seneka.

C. Give the unabbreviated official names, and the equivalent metric weights of the ingredients in the following official preparations: Compound Spirit of Ether, Dover's Powder, Compound Cathartic Pills.

D. Give the ingredients and English names for Acetum Scillæ, Acidum Sulphuricum Aromaticum, Ceratum Cetacei, Collodium cum Cantharide, Confectio Rosæ, Infusum Gentianæ Compositum, Liquor Arsenici et Hydrargyri Iodidi, Pilulæ Aloes et Mastiches, Liquor Iodinii Compositus, Syrupus Rhei Aromaticus.

E. Give the tests for recognizing Morphia, Meconic Acid, Veratria, Brucia, the Aloins.

F. Give the process for making Saccharated Pepsin, Extract of Malt and Glucose, and state how the quality of each may be judged.

G. Give the process, specific gravity and tests of purity and identity of the following: Commercial Chloroform, Stronger Ether and Creasote.

H. Name the principle which is frequently found in fleshy roots, and which is the cause of gelatinous precipitates in some pharmaceutical preparations. Does this principle exist in unripe fruits? How may it be produced? How may it be destroyed? Name an official preparation in which the principle is very often seen.

I. What is the process usually employed in producing Oil of Gaultheria? What action have the Caustic Alkalies upon the Oil? What Acid does the Oil contain? Can it be produced artificially? Give the process and a test for the Acid.

K. What is the theory of Emulsification? Describe a natural emulsion and illustrate. Give three practical formulas illustrating three different methods of preparing emulsions. State the circumstances under which it would be best to use each method.

QUESTIONS IN CHEMISTRY.

A. What is the *Leblanc Soda Process*? Write the chemical actions involved in this process. What are the side-products of the process?

B. Give the chemical formula for crystallized *Sodii Boras*. How is it affected by heat? Mention its uses in Pharmacy and in the Arts.

C. How is *Calcii Phosphas Præcipitata* prepared? Write the reactions involved. What are the impurities removed by this process of preparation?

D. State the method of preparation and the pharmaceutical uses of *Ferri Oxidum Hydratum*. Exhibit by chemical formulas the changes which it undergoes on keeping. State, also, the chemical difference between *Ferri Carbonas Saccharata* and *Ferri Subcarbonas*.

E. Enumerate the tests for *Arsenic*, explaining the chemical reaction in each case. How many of these are applicable to *Antimony* also? When applicable to both metals, state how we may distinguish one metal from the other in the results of the test.

F. Write the chemical formula of *Plumbi Acetas*, of the Salt present in *Liquor Plumbi Subacetatis*, of *Plumbi Carbonas*, and of *Emplastrum Plumbi*.

G. What is meant by *Monatomic Alcohols*? How are they related to the series of organic acids known as "Fatty Acids?" What is the organic salt of a fatty acid known as? Give an example, naming the compound.

H. Give the chemical formulas for *Glucose* and for *Cane-Sugar*. Mention the points of difference, both physical and chemical, between them. Mention the tests by which admixture of *Glucose* with *Cane-Sugar* can be detected.

I. What is the chemical formula of *Acidum Benzoicum*? Give the sources of preparation of this acid, both natural and artificial. What is the chemical relationship of this acid with *Oleum Amygdalæ Amara*?

K. From what material is *Acidum Salicylicum* made exclusively at present? Write the chemical reaction for this process. Mention the characteristic tests for this acid. To what class of organic compounds does it belong?

QUESTIONS BY THE EXAMINING COMMITTEE.

A. Give the botanical name and natural order of the plant from which *Cane-Sugar* is chiefly obtained. From what other plant is it largely obtained in Europe? Give its chemical formula and molecular weight. What action has its solution on polarized light? How does this action indicate the amount of sugar present? How is the grape sugar of commerce prepared from starch? How would you detect chemically the adulteration of cane sugar with grape sugar? How is Caramel prepared?

B. What is the official name of *Lime Water*? Write the official formula for its preparation. Write out the reaction which takes place in the process, in words or symbols. State what precaution is necessary for its preservation. What quantity of lime is held in solution in a pint of water at 60°F.? Is lime more soluble in *hot* or in *cold* water? What effect is produced upon *Lime Water* by exposure to the air? Into what official preparation does *Lime Water* enter? Write out the formula for making this preparation.

C. Give the official title of the following drugs of animal origin, also the *Common* and *Scientific* names of the animals from which they are obtained. What *part* of the animal is directed by the United States Pharmacopœia to be used? Musk, Isinglass, Cantharides, Codliver Oil, Spermaceti.

D. Give the botanical name, natural order and habitat of the plant which yields the official *Benzoin*. Describe the method pursued in obtaining it. What appearance does the drug present in commerce? To what class of substances does it belong? What official chemical product is obtained from it? Describe the mode of obtaining this product. Into what official preparation does this product enter? State another source from which a similar chemical product is obtained.

E. Give the official name and active principles of the following drugs; also, the botanical name, natural order and habitat of the plants which furnish them: *Elaterium*, *May Apple*, *Nux Vomica*, *Jalap*, *Aconite Root*.

F. Give the official name, and write out the formula, mode of preparation and dose of the following, viz.: *Tincture of American Hellebore*, *Spirit of Mindererus*, *Fowler's Solution*, *Dover's Powder*, *Antimonial Wine*.

G. What is the official name of *Hydrocyanic Acid*? Give the official formula for its preparation. Give the official formula for preparing it when wanted for immediate use. Write out the reaction which takes place during the latter process. What per cent. of *Anhydrous Acid* does

the official solution contain? Give a test for Hydrocyanic Acid in solution. What directions are given for its preservation? What is the dose of the official acid?

H. Write the official name and formula of each of the following liquid preparations of *Opium*, and give the *dose* of each, viz: Laudanum, Black Drop, Paregoric Elixir, Wine of Opium, Acetated Tincture of Opium.

I and K.

Write out a direction for preparing this prescription: Would you dispense it?

1.
 R Arsenici Iodidi, . gr. xxxv
 Hydrargyri Iodidi
 Rubri, . gr. xxxv
 Aquæ Destillatæ, f̄ss viii
 Fiat Solutio.

Signa. A teaspoonful to be taken every two hours.

Criticise this prescription:

2.
 R Hydr. Chlor., . ʒi
 Camphor. Monobrom., gr. xx
 Elixir Calisayæ, f̄ss ii
 Misce et Signa. A teaspoonful as directed.

Name the order in which the ingredients of this prescription should be added to produce at once a clear solution.

3.
 R Acidi Acetici diluti, . f̄ss iv
 Ammonii Carbonatis, q.s.
 Acidi Acetici, f̄ss i
 Tincturæ Ferri Chloridi, f̄ss ss
 Glycerinæ, f̄ss ss
 Mucilaginis Acaciæ, ad f̄ss viii
 Fiat Mistura.

Signa. A teaspoonful every three hours.

The following specimens had been selected for recognition:

MATERIA MEDICA.	PHARMACY.	CHEMISTRY.	EXAMINING COMMITTEE.
Belladonnæ Radix,	Aqua Foeniculi,	Aqua destillata,	Calum ^a , a,
Helleborus,	Infusum Quassie,	Potassii nitras,	Valeriana,
Hydrastis,	Glyceritum Aciditannici,	Sodii carbonas,	Cubeba,
Gosypii Radic. Cort.,	Liq. Ammonii Acetacis,	Sodii bicarbonas,	Benzoinum,
Cetraria,	Pulv. Ipecacuanhæ comp.	Ferri Sulphas exsicc.	Kino,
Chenopodium,	Confectio Sennæ,	Hydrarg. chlorid. m ^{ue} ,	Tinct. Opil camphor.,
Sinapis Alba,	Tinct. Opil deodorata,	Potassii ferrocyanidum,	Ceratum Resinæ,
Ergota,	Extr. Sarsapar. fluid.,	Acidum oxalicum,	Liq. Plumbi subacet.,
Sago,	Pyroxylon,	Acidum tannicum,	Ammonii chloridum,
Ammoniacum.	Ferri Oxidum hydratum.	Oleum terebinthinæ.	Sodii boras.

The practical work consisted in the preparation, by each student, of syrupus ferri iodidi, unguentum hydrargyri, an emulsion containing 50 per cent. of codliver oil, suppositories containing tannin and extract of stramonium, and of a soap plaster 4 x 6 spread on paper.

The following 117 gentlemen passed the examinations and were recommended to the Board of Trustees for the degree of Graduate in Pharmacy:

Charles Niskey Acker, Pennsylvania, *Elixiria*.
 James Addison Barkhuff, New York, *Laboratory of a Pharmacist*.
 Albert Christian Behringer, Pennsylvania, *Ferri et Ammonii Citras*.

- John Pemberton Binns, Pennsylvania, *Pharmacy*.
 Wellington Henry Bird, Pennsylvania, *Coating of Pills*.
 Cyrus Maxwell Boger, Jr., Pennsylvania, *Fluorescence*.
 Charles Henry Bohn, Ohio, *Saccharum*.
 Collier Levis Bower, Pennsylvania, *Brandied Tinctures*.
 John Marion Bradford, Pennsylvania, *Fraxinus Americana*.
 Charles Edward Buck, Maine, *Bismuthi Subnitras*.
 John Albert Bush, Illinois, *Ointments*.
 Huizinga Clarence Byers, Pennsylvania, *Manufacture of Wine*.
 Chambers Brown Clapp, Ohio, *Prunus Virginiana*.
 Jacob Miller Clark, Pennsylvania, *Glucose*.
 Jonas Gerhard Clemmer, Pennsylvania, *Liquor Potassæ*.
 Virgil Coblentz, Ohio, *Ipomæa Jalapa*.
 Isaac Cohen, Pennsylvania, *Incompatibility of Medicines*.
 Richard Frazier Collins, Ohio, *Jamaica Dogwood*.
 Wm. Moore Guilford Corrie, Pennsylvania, *Glycerin*.
 Edmund Austin Crenshaw, Jr., Pennsylvania, *Mediocrity in Pharmacy*.
 Benjamin Amos Cunningham, Maryland, *Ext. Pruni Virginianæ Fluid*.
 Charles William Dare, Pennsylvania, *Æther*.
 Charles William DeFrehn, Pennsylvania, *Rhus Glabrum*.
 Chas. August Theodore Doench, Germany, *Resin of Scammony*.
 James Edgar Drorbaugh, Pennsylvania, *Syrups by Percolation*.
 Walter Crull Dugan, Pennsylvania, *Glucose*.
 Howard Mell Edwards, Georgia, *American Ash Bark*.
 William Edgar Finney, Pennsylvania, *Ethics of Dispensing*.
 John Davies Forbes, New York, *Doryphora Decemlineata*.
 Charles McClellan Forney, Pennsylvania, *Iodine Pentabromide*.
 William Otterbein Frailey, Pennsylvania, *Drugs used as Diet for the Sick*.
 Walter Seip Freeman, Pennsylvania, *Petrolin in Ointments*.
 Samuel Harrison French, Pennsylvania, *Pepsin and its Digestive Test*.
 Joseph Mellan Fronefield, Jr., Pennsylvania, *Pharmaceutic Preparations*.
 Frank Geddis, Pennsylvania, *Quillaia*.
 Jacob Franklin D. Geiger, Pennsylvania, *New Base for Suppositories*.
 Orton Harris Gentry, Missouri, *Preparation of Syrups*.
 George Washington Goldsmith, Pennsylvania, *Scilla Maritima*.
 Howard Lee Green, Pennsylvania, *Osmorrhiza Longistylis*.
 John Ellsworth Gregory, Pennsylvania, *Resina Podophylli*.
 John Henry Harmonson, Virginia, *Stillingia Sylvatica*.
 Oscar Eugene Harris, Pennsylvania, *Pharmacist and Physician*.
 George Washington Hayes, Pennsylvania, *Commercial Powd. Rhubarb*.
 Robert G. H. Hayes, Pennsylvania, *Syrupus Ipecacuanhæ*.
 Emil Moses Herwig, Pennsylvania, *Preparation of Iodide of Iron*.
 Joseph Herbert Hulme, New Jersey, *Commercial Powd. Opium*.
 Frederick Jacob Knaus, Pennsylvania, *Alcohol*.
 Harry Howard Kneidler, Pennsylvania, *Oleic Acid and the Oleates*.
 Jacob Hamilton Knouse, Pennsylvania, *Commercial Aqua Ammoniacæ*.
 Emil John Kohl, Illinois, *Mixtures or Emulsions*.
 Newton Alexander Koser, Pennsylvania, *Botany*.
 Charles Frederick Kramer, Pennsylvania, *Gelatin Test of Astringent Drugs*.
 Fred. Balthaser Krell, Pennsylvania, *Erythroxylon Coca*.
 Walter Harry Kremer, Pennsylvania, *Cimicifuga Racemosa*.
 John Albert Lambert, Indiana, *Ammonii Iodidum*.
 Oscar F. Letoriere, Maryland, *Carbolic Acid*.
 Josiah Kirby Lilly, Indiana, *Aralia Spinosa*.
 David Christopher Lyman, Kentucky, *Advance of Science*.
 Alexander McAlister, New Jersey, *Extractum Carnis*.
 Robert Davis McDougal, Illinois, *Dilute Phosphoric Acid*.
 Samuel Harbeson McGowan, Pennsylvania, *Radix Taraxaci*.
 Henry Courad Mannel, New York, *Hints on Prescriptions*.

Franklin Augustus Matthes, Pennsylvania, *Primitive compared to Modern Pharmacy.*

W. Leaming Matthews, Pennsylvania, *Pharmaceutical Preparations.*

William Harry May, New Jersey, *Prescriptions.*

William Henry Mehl, Kansas, *Adulteration of Cream Tartar.*

James Honey Mercer, Ohio, *Acidum Tartaricum.*

Evan B. Merriam, New York, *Emulsion of Codliver Oil.*

Aaron Gable Miller, Pennsylvania, *Syrups by Cold Percolation.*

John Knox Miller, Ohio, *Oils and Fats.*

Lucius Wright Moody, New York, *Boracic Acid.*

William John Morton, Pennsylvania, *Emulsions.*

Edward Joseph Muldoon, Pennsylvania, *Opium.*

Alfred Mullhaupt, Pennsylvania, *Eriodictyon Californicum.*

John Henry Murray, Pennsylvania, *Palatable Medicines.*

William Gilmore Nixon, Pennsylvania, *Microscope in Pharmacy.*

George Leonard Ott, Delaware, *Eupatorium Perfoliatum.*

William Franklin Potteiger, Pennsylvania, *Acidum Sulphuricum Aromaticum.*

Edward Samuel Power, Maryland, *Cinchona Bark.*

John Abram Price, New York, *Purified Chinoidine.*

Ross Rambo, Pennsylvania, *Eucalyptus Globulus.*

George Prentice Raser, Pennsylvania, *Chemical Research.*

Gustav Adolph Renz, Minnesota, *Estimation of Alkaline Iodides.*

Theodore William Reuting, Pennsylvania, *Petroleum.*

William Davis Reynolds, Pennsylvania, *Habitual Use of Narcotics.*

Charles Naphtel Riggs, Ohio, *Detection of Alcohol in Essential Oils.*

William Ernest Roeschel, Missouri, *Chemical Urinalysis.*

William Robinson Ross, Pennsylvania, *Aspidosperma Quebracho.*

George Matthias Schamps, Ohio, *Benzoate of Calcium.*

Frederick Charles Scheible, Alabama, *Morphiometric Strength of Opium.*

Samuel Edward Schweitzer, Pennsylvania, *Toxicology.*

Charles August Schoenenberger, Pennsylvania, *Oil of Bitter Almonds.*

Frederick Seitz, Pennsylvania, *Mercury.*

John George Seitz, Ohio, *Dilute Phosphoric Acid.*

George Whitfield Sellers, Ohio, *Syrups by the Cold Process.*

Benjamin Franklin Sholl, Pennsylvania, *Comparative Value of Benzoin and Storax.*

Judson Stewart Smith, Pennsylvania, *Soluble Hypodermic Tablets.*

Eugene Abraham Stahler, Pennsylvania, *Podophyllum.*

Harry Reader Stallman, Pennsylvania, *Celery Seed.*

Frederick William Edward Stedem, Ohio, *Value of Cinchona Bark.*

Harry Ehrhart Steinhilber, Iowa, *Model Pharmacy.*

William Denny Stevenson, Delaware, *Preparation of Citrate of Iron.*

Cornelius Whitenach Stryker, Pennsylvania, *Glucose from Cassava.*

Walter Scott Swayne, Pennsylvania, *Pharmaceutical Science.*

William Montelius Swentzell, Illinois, *Fermentation.*

Daniel Judson Thomas, Pennsylvania, *Administration of Liquid Medicines.*

Oscar Ernest Thomas, Virginia, *Water.*

Herman Emanuel Thoms, Indiana, *Phosphorus and its Therapeutic Value.*

Paul Charles H. Wallschlager, Wisconsin, *Simaruba Eccelsa.*

Edwin Connor Warg, Pennsylvania, *Hydrobromic Acid.*

Julius Way, New Jersey, *Commercial Bromide of Potassium.*

Henry Webster, Illinois, *Salicylate of Cinchonidia.*

George Edward Wevill, Pennsylvania, *Nitrogen.*

Simon Wolf, Pennsylvania, *Subnitrate of Bismuth.*

Stephen Disbrow Woolley, New Jersey, *Dover's Powder.*

Clifford Monroe Woolston, New Jersey, *Pilocarpus Pennatifolius.*

Isaac Wilson Worthington, Pennsylvania, *Zeae Stigmata.*

A pleasant reunion took place in the museum hall of the College on the evening of Tuesday, March 14th, in response to an invitation of the fac-

ulty, the graduates, the members of the Board of Trustees, and the assistants of the professors participating. After justice had been done to the collation provided, speeches were made relating to the history of the College, to the deceased members and professors that had been active in it, to the prospects and contemplated improvements for the future, to College life and other matters, both humorous and serious, interspersed with recitations and songs.

The commencement of the sixty-first session of the College took place at the Academy of Music, on the evening of March 15th, the large edifice being well filled with an appreciative audience. The degree of Ph.G. was conferred upon the graduates by the President of the College, Dillwyn Parrish, after which the Procter prize gold medal was awarded by Mr. Thomas Perot, on behalf of the Board of Trustees, to Virgil Coblentz, of Springfield, O., and to Jonas G. Clemmer, of Philadelphia, and honorable mention was made of the following, who had attained the grade *very satisfactory* at the examinations: B. A. Cunningham, C. A. Schoenenberger, S. E. Schweitzer, D. J. Thomas, J. H. Harmanson, G. M. Schambs, J. K. Lilly, W. H. Mehl, F. C. Scheible, W. E. Roeschel, Julius Way, J. H. Knouse, E. B. Merriam, F. W. E. Stedem, O. H. Gentry, W. D. Reynolds, G. W. Hayes and T. W. Reuting.

The prize, a Zentmayer histological microscope, offered by the chair of *materia medica*, was not awarded for microscopical examination of American drugs, but for the best histological descriptions given in the examination; its recipient was Virgil Coblentz, and honorable mention was made of J. G. Clemmer, B. A. Cunningham, J. H. Harmanson, C. A. Schoenenberger, G. M. Schambs, H. L. Green, D. J. Thomas and G. L. Ott, to the latter for microscopical studies. The prize of a Troemner analytical balance, offered by the chair of chemistry, for the best knowledge of and work on qualitative and quantitative analysis as shown by the thesis, was likewise awarded to V. Coblentz, and honorable mention accorded to J. A. Price, Simon Wolf, G. W. Hayes and J. H. Knouse.

Professor Sadtler delivered the valedictory address, which was listened to with much attention, and at the close of which the graduating class presented a set of the new edition of *Encyclopedia Britannica* to Professor Maisch, and a handsome clock and pair of vases to the Actuary of the College, Thomas S. Wiegand.

As usual, the exercises alternated with music by the Germania Orchestra, and closed with the distribution of floral tributes and other presents left upon the stage by the friends of the graduates.

THE ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY held its annual meeting on Monday, March 13th, when the following officers were elected: President, Thomas H. Potts; Vice Presidents—L. E. Sayre and C. A. Weidemann; Recording Secretary, Wm. E. Krewson; Corresponding Secretary, Wm. A. Ball; Treasurer, Edward C. Jones; Executive Board—J. E. Cook, J. S. Beetem, Louis Genois, D. W. Ross, H. Trimble and Wallace Procter; Trustee of Sinking Fund, T. S. Wiegand; Orator for 1883, Louis Genois.

On the evening of the same day the reception of the Alumni was held at the College in the Pharmacy lecture room, which was well filled by the Alumni, their ladies and friends. The President, Mr. Henry Trimble, presided. The Alumni gold medal was presented to Virgil Coblentz, and certificates to the following graduates who had passed the best *very satisfactory* examination in the branches named, namely, to B. A. Cunningham, materia medica; to J. G. Clemmer, pharmacy; to W. H. Mehl, chemistry; A. Schoenenberger, general pharmacy; to T. W. Reuting, pharmaceutical manipulations. The Alumni certificate for the best Junior examination was presented to Miss Grace Lee Babb, of Eastport, Me., and honorable mention was accorded to W. F. Jungkunz and C. L. Leonhard, who had passed a very satisfactory Junior examination. The annual address was delivered by Prof. F. B. Power, and the valedictory address on behalf of the graduates by H. Webster.

After the close of these exercises, the members of the Zeta Phi Alpha Society held their first triennial reunion in the new Museum Hall of the College. About one hundred members and ladies sat down to the supper provided for the occasion, and spent a few pleasant hours of social intercourse.

THE NEW YORK COLLEGE OF PHARMACY held the commencement of the 52d Session at Chickering Hall on Wednesday evening, March 22d, when the Degree of Ph.G. was conferred upon the following candidates:

H. C. Baker	P. E. Hommell	E. M. Sedgwick
J. Beavers	H. W. Hoops, Jr.	G. E. Schneider
L. I. Bischof	W. Hunte	J. R. Schoonover
G. Boehme	J. H. Hutchens	E. F. Sickenberger
H. Bohmfalk	J. E. Jackson	R. Sieburg
F. Bosch, Jr.	O. Jantze	H. N. Siegenthaler
C. C. Bradley	W. Johnson	W. E. Simpson
J. E. Branigan	L. H. Lesser	T. A. Smith
W. A. Burrows	J. Loewenstein	W. Stern
H. A. Chapin	Theo. Lutz	G. C. P. Stolzenburg
J. Clarke	J. P. Manck	C. E. Tallman
G. H. Cooke	W. J. McLaughlin	C. Teubner
G. Dahlbender	George Minrath	W. H. Tyler
R. B. Dakin	D. R. Morgan	A. F. Underwood
E. A. Denicke	D. C. Moriarta	A. C. G. Vosseler
J. F. Doring	H. G. Nadler	O. Wagner
J. Eckert	I. L. Nascher	R. Walker
B. Ettinger	G. R. Newby	M. L. Walters
W. V. Everett	P. O'Connell	M. C. Warsaw
F. W. Fenn	P. O'Reilly	F. I. Watkins
F. L. Fieger	W. J. Parshall	F. Wenzel, Jr.
L. Fischer	J. E. Parsons	G. F. Westbrook
J. P. Foland	C. A. Passmore	E. Winters
R. Gastmeyer	E. R. Petty	F. Wirth
H. Goemann	H. R. Purdy	J. G. Wischerth
J. M. Hedenberg	M. Rafter	J. Woelfel, Jr.
George O. Heffter	H. V. Roese	G. B. Wray
H. E. Hoffmann	F. Ruppert	

The following passed in Botany and Chemistry: DeL. Haigh and H. J. Owens, and L. Stollmann in Pharmacy only.

At the annual meeting of the College, the following officers were elected: President, Ewen McIntyre; Vice Presidents—Gustavus Ramsperger, Henry J. Menninger, George C. Close; Treasurer, Starr H. Ambler; Secretary, M. L. M. Peixotto; Trustees—Joseph B. Mauch, F. F. Knapp, for one year; A. Tscheppe, Gust. Balser, Hermon W. Atwood, Herbert Hazard, for three years; Delegates to American Pharmaceutical Association—Charles Rice, G. J. Seabury, M. L. M. Peixotto, L. M. Royce, T. J. Macmahan.

MARYLAND COLLEGE OF PHARMACY.—The commencement of the thirtieth course was held at the Academy of Music, March 29th, when the degree of Ph.G. was conferred by the President, Dr. Jos. Roberts, upon the following candidates:

Samuel Bachrach, Virginia, *Potassium Iodide*.
John G. Beck, Maryland, *Salicylic Acid*.
Thos. W. Blackstone, Virginia, *Opium*.
J. Fuller Frames, Maryland, *Tabacum*.
William P. Friese, Maryland, *Zincum*.
Chas. S. Haugh, W. Virginia, *Cinchona and Alkaloids*.
August Kach, Maryland, *Eucalyptus Globulus*.
Sylvester R. Kelley, Jr., Maryland, *Carbolic Acid*.
William Kroh, Maryland, *Ethers*.
Gustave Lindeman, Maryland, *Emulsions*.
Robert S. McKinney, Maryland, *Organic Chemistry*.
J. Gordon Mallette, Georgia, *Cascara Sagrada*.
Samuel Schmidt, Maryland, *Heat*.
Anthony H. Schultze, Maryland, *Iron Oxides*.
Howard C. Silver, W. Virginia, *Iodine and its Compounds*.
J. Charles Smith, Pennsylvania, *Hydrargyrum*.
Conrad Wich, Maryland, *Pilocarpus*.

The following prizes of the College were awarded: to Samuel Schmidt, gold medal; to August Kach, Webster's Unabridged Dictionary and Fresenius' Analysis; to Conrad Wich, Stillé & Maisch's Dispensatory and Parrish's Pharmacy. William Krauss received the Junior Class prize of the College, consisting of a copy of Parrish's Pharmacy, and Anthony B. Schultze was awarded the Simon prize, consisting of a gold medal.

The Junior students entitled to honorable mention, are Louis F. Kornman, J. J. Valentine, A. Edwin Schmidt, Geo. A. Thompson and Manes E. Fuld.

The valedictory address was delivered by Rev. Robt. H. Fulton.

ALUMNI ASSOCIATION OF THE LOUISVILLE COLLEGE OF PHARMACY.—At the seventh annual meeting held on Tuesday evening, March 14th, the following officers were elected for the ensuing year: President, Edward Goebel; Vice Presidents—Otto E. Müller, Wm. F. Tafel; Treasurer, O. A. Beckmann; Recording Secretary, A. J. Elwang; Corresponding Sec-

retary, Simon Flexner; Executive Board—Buckle, Schoettlin, Flexner, Rudell and Scheffer, Jr.; Delegates to American Pharmaceutical Association—Messrs. Mueller, Beckman, Scheffer, Tafel and Schweitzer.

The first prize, a gold medal, was awarded to Simon Flexner for obtaining highest average in Senior class, also a U. S. Dispensatory for best average in *Materia Medica*. Maisch's Organic *Materia Medica* was awarded to Walter B. King, of Waco, Texas, for best average in Junior class, also Attfield's Chemistry for best average in Chemistry in Junior class.

ST. LOUIS COLLEGE OF PHARMACY.—The commencement of the sixteenth course took place at Liederkrantz Hall on the evening of March 16th, in the presence of a large audience, the exercises being opened with an address by the President, F. W. Sennewald, who also conferred the degree of Ph.G. upon the following candidates:

Gust. H. J. Andreas,	Chas. W. Ferguson,	Wm. Kuhlmege,
Albert P. Bentz,	Jas. G. Flint,	Louis F. Lehnher,
Chas. W. Bentz,	Edward G. Gerding,	Theo. C. Loehr,
Geo. Billerth,	Arthur T. Grindon,	Paul W. Scheliha,
Adolph Brandenburger,	Gust. J. Hermann,	Wm. R. Schettler,
Thos. A. Buckland, Jr.,	Wm. A. Hitzelberger,	Joseph P. Tierney,
Dennis A. Byrne,	Aurin B. Hunt,	Jas. W. C. Weums,
Otto Claus,	Lewis P. Kilbourne,	Ernest A. Woehrlin,
Fred. B. Drescher,	Erwin J. Koeberlin,	Francis F. Zeller.
Conrad W. Duewel,		

Honorable mention was made of C. W. Ferguson, E. J. Koeberlin, D. A. Byrne, T. C. Loehr and C. W. Bentz; also of ten Junior students who had passed very creditable examinations. The valedictory address in behalf of the faculty was delivered by Prof. O. Oldberg, who spoke on the changes in the forthcoming new-pharmacopœia; and the address on behalf of the graduates by J. W. C. Weums. The Alumni medal for the best examination was presented to J. G. Flint. The exercises were enlivened by music, closed with the distribution of floral offerings and followed by a social hop.

PITTSBURG COLLEGE OF PHARMACY.—The third commencement took place at Lafayette Hall, on March 23d, when President G. A. Kelly conferred the degree of Ph.G. on the following candidates: Frank W. Walker, New Brighton, Pa.; Thos. B. Rodgers, Waynesburg, Pa.; George B. Stauver, Wheeling, W. Va.; John A. Schmidt, Pittsburg; Wm. B. Means, Allegheny City.

An address was delivered by Dr. W. H. Daly, and the valedictory address by Prof. S. H. Stevens. After the conclusion of the exercises those present enjoyed dancing and social intercourse for several hours.

THE LANCASTER COUNTY, PA., PHARMACEUTICAL ASSOCIATION was organized March 23, in Association Hall, Lancaster. A constitution and by-laws were adopted and signed by fifteen members. An adjourned meet-

ing for the election of officers will be held in Grand Army Hall, on April 13.

THE IOWA PHARMACEUTICAL ASSOCIATION held its third annual meeting at Des Moines on February 14th and 15th, the President, George B. Hogin, in the chair; Emil L. Boerner, Secretary. The President delivered his annual address and reports were read from the Secretary, Treasurer and Executive Committee. Charges had been preferred against the former Secretary, H. W. Dodd, which, after having been investigated by a special committee, resulted in the adoption of a resolution expelling Mr. Dodd from the Association. Reports were also read from the various standing and special committees and considerable discussion ensued on the subjects of trade interests and amendments to the pharmacy law. A memorial to the Legislature was adopted and signed by the members present, recommending to so amend the pharmacy law as to make its language unequivocal, with the view of preventing abuses in the traffic of liquors under the guise of a druggist; amendments were also recommended favoring an annual registration tax of \$1.00, requiring the prominent display of the certificate of registration and forfeiting the right of re-registration, except by examination, to those who are registered by reason of being in business at the passage of the pharmacy act and who discontinue the drug business for twelve months.

The officers elected for the ensuing year are A. R. Townsend, of Boone, President; J. W. Ellis, of Patterson, C. R. Wallace, of Independence, and W. C. Bryant, of Cedar Falls, Vice Presidents; Emil L. Boerner, of Iowa City, Secretary; C. H. Ward, of Des Moines, Treasurer, and Norman Lichty, of Des Moines, J. A. Treat, of Stuart, and Gust. Schlegel, of Davenport, Executive Committee.

The various standing committees were appointed and, after passing votes of thanks to the President and other officers, the Association adjourned to meet next year at Davenport.

INDIANAPOLIS PHARMACEUTICAL ASSOCIATION.—In response to a call issued, a number of Indianapolis pharmacists assembled, March 8th, at Merchants' Exchange to make arrangements with the view of organizing a pharmaceutical association. Mr. Eli Lilly was chosen temporary chairman and Jos. R. Perry temporary secretary. After the objects of the meeting had been stated and the various committees appointed, steps were at once taken for organization, and a committee on constitution, by-laws and code of ethics was appointed, to report at a meeting to be held March 15th.

At this meeting, Geo. W. Sloan was made chairman and Jos. R. Perry, secretary. The committee made their report, which was accepted and adopted, and the constitution, by-laws and code of ethics was signed by nearly all present.

The Secretary then read communications from nearly 100 pharmacists throughout the State, who signified their intention of attending the meeting, May 9th, when it is hoped a State association may be organized.

Following this came the election of officers, which resulted as follows: President, J. B. Dill; Vice Presidents—J. N. Hurty, H. C. Pomeroy; Recording Secretary, Frank H. Carter; Corresponding Secretary, John A. Lambert; Treasurer, Henry Kielhorn; Executive Committee—George W. Sloan, F. A. Bryan, C. H. Schad.

A motion made by Mr. Sloan to select a subject for general discussion at the next meeting, March 29th, was carried, and "Emulsions" was selected.

EDITORIAL DEPARTMENT.

LOCAL AND STATE PHARMACEUTICAL ASSOCIATIONS.—At the last meeting of the Pennsylvania Pharmaceutical Association a report brought forward by the Trade Association of Philadelphia Druggists was the cause of the recommendation to form County Societies. We are pleased to be able to report in this number the organization, under this recommendation of the first County Pharmaceutical Association outside of Philadelphia, that of Lancaster. A number of years ago a similar society was in existence in Allegheny county, from which the Pittsburg College of Pharmacy originated. The trade interests, however, we believe, are best taken care of by organizations having that object especially in view, and we hope that the example of Lancaster county may soon be followed by other localities.

The Indianapolis Pharmaceutical Association, the organization of which is reported in the present number, is to be regarded as the forerunner of an association embracing the pharmacists and druggists of the State of Indiana, and which it is contemplated to organize in Indianapolis May 9th. There being much excellent material in that State, a successful organization and efficient association may be expected, and since quite recently a State association was formed in Virginia there will be few States left in which no State Pharmaceutical Association exists, or where it has been allowed to become dormant.

NOSTRUMS AND HOUSEHOLD REMEDIES.—We have received the following communication:

As I see from the "American Journal of Pharmacy," 1882, p. 93, you seem to think that people could in a great measure be influenced in their indiscriminate employment of secret medicines (whether patent or proprietary) by being informed of their composition, etc. Will you allow me to dissent from you?

People here in the United States (and, it seems, largely in Europe, too) are accustomed to doctor themselves, and prefer, naturally, already put-up medicines, stated by somebody—immaterial who—to be good for their supposed ailments. They feel bound to get them, they are not used to be without them—they *must* have them! Now, I contend that mere telling and proving to them that all patent medicines are frauds upon their health and pocket, and likely to produce great mischief, and all that—will be looked upon with suspicion, as dictated by self-interest, one way or the other. You will need something stronger, more tangible.

People are bent on using put-up medicines. Well, humor them! Give them what they want! Let them, instead of concoctions, the composition of which everybody ignores—even the makers—let them get medicines put up by conscientious men (for instance, the pharmacists themselves), and having the formula stated in full on the label. In this way you fight, and will ultimately defeat, the patent medicine swindle, with its own weapons. When you have succeeded in breaking the back of the patent pest in this way (by making it unprofitable), then you and the physicians can turn your attention to your late ally, and modify the formulas and directions so as to keep both within safe bounds.

Preaching is very well, but we have to deal with human nature as it is, not as it ought to be. People want to take something!

Respectfully yours,

HANS M. WILDER.

Detroit, February 25, 1882.

The editor's views do not differ to a very great extent from those expressed by our correspondent, as will be readily seen by the numerous editorial remarks printed in former volumes of the JOURNAL. Information on health matters is, in our opinion, not disregarded by intelligent persons; to ignorant or prejudiced people argumentation is of little or no avail. Yet, because there are many of the latter kind, should the former class be left to drift along among the many secret medicines that flood the market everywhere? This question is intimately connected with that relating to the composition of the nostrums and the danger arising from the indiscriminate use of poisonous compounds. Nearly all the States have enacted laws regulating the sale of poisons; yet, under the garb of patent medicine, poisons in dangerous quantities may be and are sold to the most ignorant, and not unfrequently shorten the life of the over-confiding. Such cases have been often cited in medical and pharmaceutical journals, and at the present time a case is being investigated before the Coroner of Philadelphia, where an infant, attacked with croup, died of the effects of a dose of a nostrum, a so-called cough syrup, which is said to contain a powerful narcotic. If the composition of such concoctions was known, if manufacturers were compelled to divulge the composition of the nostrums by printing the correct ingredients upon the labels, the harm that would be done by them would be greatly lessened, and under the poison laws of the different States many of the so-called popular medicines could then not be indiscriminately sold, and would doubtless be replaced by preparations made according to authorized formulas; such a course we have always held "to be the only rational one calculated to be an entering wedge for the suppression of nostrum quackery" ("Am. Jour. Phar.," 1874, p. 90).

Medicine and Pharmacy have as one of their main objects the preservation of health and life, and it is strange, indeed, that a united move of the two professions has not yet been made in the correction of an acknowledged evil. Household medicines, to be of practical usefulness, should be adapted to the wants of the different localities, and both physicians and pharmacists would, in our opinion, only consult and advance their own interests, if they were to promote the interests of the public by pointing out the manner of preserving the health, and offering the means of alleviating slight indispositions, for which the large majority of the people

rarely consult the physician. It is possible that one cause of this non-action may be found in the non-existence of local pharmaceutical societies, a drawback which bids fair to be remedied in the near future; but much good might have been accomplished in this direction by the numerous county medical societies, if they had agreed upon simple remedies for ordinary complaints, to be furnished by the pharmacists of their localities in place of the secret medicines.

Such, or similar plans, carried out in a liberal spirit, we feel convinced "would accomplish more towards reducing the number of proprietary medicines and dangerous compounds indiscriminately sold, than ever so many pamphlets addressed to the public, or resolutions passed by medical or pharmaceutical societies" (*"Am. Jour. Pharm.,"* 1874, p. 542).

We do not believe that people want "put-up" medicines; those living in thinly populated districts will necessarily want to keep a certain quantity of medicine on hand for such ailments as their experience has taught them, are likely to occur; this want should be supplied. Where drug stores are readily accessible, it will as a rule be preferred to purchase only as occasion requires; that want should also be supplied. We know of no better way to accomplish this than the one pointed out above; but we cannot see any inconsistency in a course that contemplates at the same time giving information to the public, tending to impart more correct views on the preservation of health and the cure of disease, than can be obtained from the circulars and pamphlets of manufacturers of secret medicines.

CORRASSA COMPOUND.—We give place to the following communication, which gives the plain facts in relation to this largely advertised nostrum. None of our readers has probably been "taken in" by the "generous" offer of the advertiser, and it is needless to state that the plants—or are some of them animals?—can nowhere be had in the wide, wide world, except from the "Rev." proprietor of the secret:

Editor American Journal of Pharmacy:

Having long seen the advertisement of "Rev. Jos. T. Inman, Station D, N. Y. City," offering, gratis, "a recipe for the speedy cure of all diseases brought on by errors of youth," etc., and believing him to be one of those who prey upon this unfortunate class, I sent for the "Recipe." It is as follows:

Extract of corrassa apimis,	eight drachms.
Extract of selarmo umbellifera,	four drachms.
Powdered alkermes latifolia,	three drachms.
Extract of carsadoc herbalis,	six drachms.

This mysterious formula is accompanied by minute directions and a lengthy and pathetic history of its discovery in "South America."

It is needless to add that the "Rev." very kindly offers to send a package on receipt of \$3.50—"actual cost."

The above is but one address under which this same man sails; "Geo. B. Tuttle, 31 Maiden Lane, N. Y.," will bring the same circular and recipe—only with different name.

Believing it to be the duty of all honest men (pharmacists especially, as they have greater opportunities to do so) to expose such frauds and quack nostrums generally, I send this to the JOURNAL.

A. M. MARTIN.

Red Oak, Iowa, March 23, 1882.

PHOSPHATE OF IRON.—A correspondent, whom we should have preferred to answer by letter if he had sent us his address, inquires if free hydrogen is liberated in making phosphate of iron according to the process of the British Pharmacopœia. On adding together ferrous sulphate and phosphate of sodium, a white precipitate is obtained which, if the air be totally excluded, after washing and drying, forms a white powder, having the composition $\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$, which is that of the mineral vivianite. In contact with air, however, oxidation takes place and the resulting compound has a grayish-, greenish- or steel-blue color, and contains both ferrous and ferric phosphates in variable proportion. The analytical results obtained by different investigators varied as follows: FeO 10.23–30.47, Fe_2O_3 36.8–12.93, P_2O_5 25.8–31.20, H_2O 22–28.1 per cent. A number of these blue phosphates have been analyzed by Wittstein, whose paper will be found in "Repert. für die Phar.," 1845, vol. 89, p. 145. Since this oxidation is effected by the oxygen of the air, it is evident that hydrogen is not evolved.

THE SCIENTIFIC AMERICAN, whose office was recently destroyed by fire in New York, shortly afterwards located at 261 Broadway, corner of Warren street. We are glad to learn that no loss of types, plates, etc., was occasioned by the fire, since the printing was done in another building.

OBITUARY.

CHARLES HOAGLAND DALRYMPLE, a prominent apothecary of Morristown, N. J., died there March 4th, after a short illness, of pneumonia, having nearly completed his fifty-second year. He was born near Dover, Morris county, N. J., and in his sixteenth year engaged as an apprentice in the drug business with Jacob M. King at Morristown. Five years later he accepted a position in Canton, Madison county, Miss., but in 1853 he returned to Morristown, taking charge of the drug store of J. F. Vorhees, in which he soon became a partner, and in 1858 the sole proprietor.

He joined the American Pharmaceutical Association in 1860, and although he rarely took any prominent part in its deliberations, his kind, genial and warm-hearted disposition, as well as his mature judgment, love of work and sterling qualities as a man secured him the friendship and esteem of all members who became acquainted with him; important committee work entrusted to him on several occasions was always well performed.

He was also one of the organizers and the first President of the New Jersey Pharmaceutical Association, and took great interest in its welfare and in the success of the pharmacy law of his native State. In the community where he resided he was repeatedly elected to various positions of honor and trust, in all of which he acquitted himself with his accustomed care, zeal and reliability. The deceased leaves a widow, three sons and two daughters. During the funeral services the stores of Morristown were closed out of respect to his memory.

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